Measurement instrument

Measurement instrument		
Instrument	Factory owner	Model name
AC SOURCE	CHROMA	6590
LOAD	CHROMA	63303, 6334
SCOPE	Tektronix	DPO-5034
Differential Probe	Tektronix	P5205A
Current Probe	Tektronix	TCP202 and TCP303
Current Amp	Tektronix	TCPA300
SCOPE Probe	Tektronix	TPP0500
Power analyzer	CHROMA	6630
ATS SYSTEM	CHROMA	CHROMA-6000
DVM	Agilent	34970A

Approved by : ______________________

Checked by : CH.HSU

Test by : Jang.Lin

ATS : Jang.Lin

Waveform : Jang.Lin

Issues data : 2014.01.09

DPS-1200AB-4 A TEST REPORT

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Electrical Data

3.1 AC Input Data

3.1.1 AC Input

The AC input is done via an IEC 320 C-14 power inlet. This inlet is rated for 10A / 250VAC.This connector is located at the front side of the power supply (rear side system). There is a possibility to fix the line cord to avoid accidental disconnection. Power supply is designed to enable system implementation that uses multiple-phase AC input power. In this configuration, not all power supplies in a system are required to be on the same AC input phase

3.1.2 Power Factor Correction

The power supply must meet the power factor requirements stated in the Energy Star® Program Requirements for Computer Servers. These requirements are stated below.

Output power	10% load	20% load	50% load	100% load
Power factor	> 0.85	> 0.95	> 0.95	> 0.95

Tested at 230Vac, 50Hz and 60Hz and 115VAC, 60Hz

Test conditions:
Sample : NO.1
Vin : 115Vac/60Hz, 230Vac/50Hz
O/P Load : 10%, 20%, 50%, 100% Load
AMB : 0oC, 25℃, 50oC

Numerical Result: PASS

AMB	AC Condition	PF Reading			
		10% Load	20% Load	50% Load	100% Load
0^oC	115Vac/60Hz	0.989	0.991	0.995	0.999
	230Vac/50Hz	0.937	0.976	0.991	0.996
25^oC	115Vac/60Hz	0.989	0.991	0.995	0.999
	230Vac/50Hz	0.938	0.977	0.991	0.996
50^oC	115Vac/60Hz	0.990	0.991	0.995	0.999
	230Vac/50Hz	0.940	0.978	0.992	0.997
SPEC		>0.85	>0.95	>0.95	>0.95

※ ATS TEST

3.1.2 Power Factor Correction

The power supply shall be tested as described in EN 61000-3-2 Class A and the guidelines for the suppression of Harmonics in Appliances and General Use Equipment Class A for harmonic line current content at full rated power.

Table 1 - Harmonic Limits for Class A equipment

	Per: EN 61000-3-2		Per: JEIDA MITI
Harmonic Order n	**Maximum permissible Harmonic current at 230Vac/50Hz in Amps**		**Maximum permissible Harmonic current at 100Vac/50Hz in Amps**
Odd harmonics			
3	2.3		5.29
5	1.14		2.622
7	0.77		1.771
9	0.4		0.92
11	0.33		0.759
13	0.21		0.483
15≤ n ≤39	0.15x (15/n)		0.345x (15/n)
Even harmonics			
2	1.08		2.484
4	0.43		0.989
6	0.3		0.62
8≤ n ≤40	0.23x (8/n)		0.529x (8/n)

3.1.2 Power Factor Correction

Test condition:

Sample NO.1

AMB.25℃

PFC Test Report

Delta Model No: DPS-1200AB-4A **Rev:** S1F **Date:** 2013/10/1

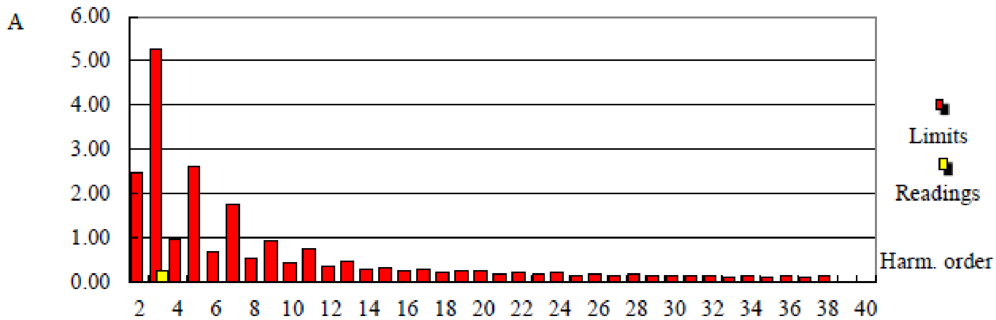
Customer: NEC

Design Phase: **Rev:**

Load Condition: +12V/82A, 12Vsb/2A

Standards EN61000-3-2/IEC1000-3-2 **Limit :** Class A **PF :** 0.9997

AC Input 100.27 V, 50.000 Hz, 11.52011 A, 1154.7843 Watts.



H#	Reading	Limit	%	Result	H#	Reading	Limit	%	Result
1	11.516660			PASS	21	0.003840	0.245760	1.56%	PASS
2	0.014290	2.477280		PASS	22	0.003030	0.191840		PASS
3	0.272510	5.275680	5.17%	PASS	23	0.006780	0.224390	3.02%	PASS
4	0.002270	0.986320		PASS	24	0.005320	0.175860		PASS
5	0.021270	2.614900	0.81%	PASS	25	0.006550	0.206440	3.17%	PASS
6	0.004840	0.688130		PASS	26	0.003690	0.162330		PASS
7	0.008790	1.766210	0.50%	PASS	27	0.005150	0.191150	2.69%	PASS
8	0.003500	0.527570		PASS	28	0.004710	0.150730		PASS
9	0.008880	0.917510	0.97%	PASS	29	0.008300	0.177970	4.66%	PASS
10	0.006800	0.422050		PASS	30	0.005850	0.140680		PASS
11	0.009790	0.756950	1.29%	PASS	31	0.010770	0.166480	6.47%	PASS
12	0.005930	0.351710		PASS	32	0.004220	0.131890		PASS
13	0.009020	0.481690	1.87%	PASS	33	0.009660	0.156390	6.18%	PASS
14	0.006150	0.301470		PASS	34	0.001400	0.124130		PASS
15	0.002030	0.344070	0.59%	PASS	35	0.009740	0.147460	6.61%	PASS
16	0.005050	0.263780		PASS	36	0.002560	0.117240		PASS
17	0.003200	0.303590	1.05%	PASS	37	0.011270	0.139490	8.08%	PASS
18	0.003930	0.234470		PASS	38	0.004610	0.111070		PASS
19	0.000800	0.271630	0.29%	PASS	39	0.011560	0.132330	8.74%	PASS
20	0.006100	0.211030		PASS	40	0.003040	0.105510		PASS

Test result : PASS

Remark : AC SOURCE:Chroma 6590 POWER ANALYZER: CHROMA-6630

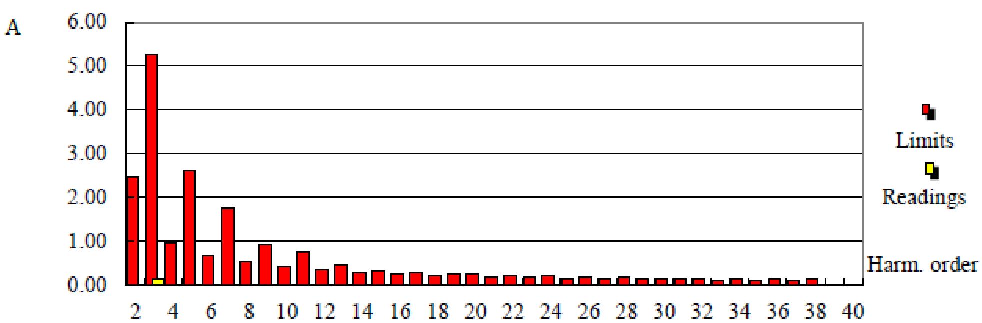
3.1.2 Power Factor Correction

Test condition:
Sample NO.1
AMB.25℃

PFC Test Report

Delta Model No: DPS-1200AB-4A **Rev:** S1F **Date:** 2013/10/1
Customer: NEC
Design Phase: **Rev:**
Load Condition: +12V/41A, 12Vsb/1A

Standards EN61000-3-2/IEC1000-3-2 **Limit :** Class A **PF :** 0.9993
AC Input 100.28 V, 50.000 Hz, 5.57489 A, 558.6456 Watts.



H#	Reading	Limit	%	Result	H#	Reading	Limit	%	Result
1	5.572460			PASS	21	0.008070	0.245730	3.28%	PASS
2	0.005800	2.476950		PASS	22	0.002160	0.191820		PASS
3	0.152910	5.274990	2.90%	PASS	23	0.012150	0.224360	5.42%	PASS
4	0.001080	0.986190		PASS	24	0.002210	0.175830		PASS
5	0.021600	2.614560	0.83%	PASS	25	0.011560	0.206410	5.60%	PASS
6	0.002520	0.688040		PASS	26	0.001330	0.162310		PASS
7	0.017700	1.765970	1.00%	PASS	27	0.012440	0.191120	6.51%	PASS
8	0.003260	0.527500		PASS	28	0.001200	0.150710		PASS
9	0.008830	0.917390	0.96%	PASS	29	0.012600	0.177940	7.08%	PASS
10	0.004140	0.422000		PASS	30	0.001850	0.140670		PASS
11	0.007150	0.756850	0.94%	PASS	31	0.013230	0.166460	7.95%	PASS
12	0.002500	0.351670		PASS	32	0.001840	0.131870		PASS
13	0.005600	0.481630	1.16%	PASS	33	0.012050	0.156370	7.71%	PASS
14	0.002570	0.301430		PASS	34	0.002750	0.124120		PASS
15	0.001390	0.344020	0.40%	PASS	35	0.012450	0.147440	8.44%	PASS
16	0.003590	0.263750		PASS	36	0.001880	0.117220		PASS
17	0.005940	0.303550	1.96%	PASS	37	0.011620	0.139470	8.33%	PASS
18	0.002300	0.234440		PASS	38	0.000600	0.111050		PASS
19	0.005790	0.271600	2.13%	PASS	39	0.009750	0.132320	7.37%	PASS
20	0.002150	0.211000		PASS	40	0.001000	0.105500		PASS

Test result : **PASS**

Remark : AC SOURCE:Chroma 6590 POWER ANALYZER: CHROMA-6630

3.1.2 Power Factor Correction

Test condition:

Sample NO.1

AMB.25℃

PFC Test Report

Delta Model No: DPS-1200AB-4A **Rev:** S1F **Date:** 2013/10/1

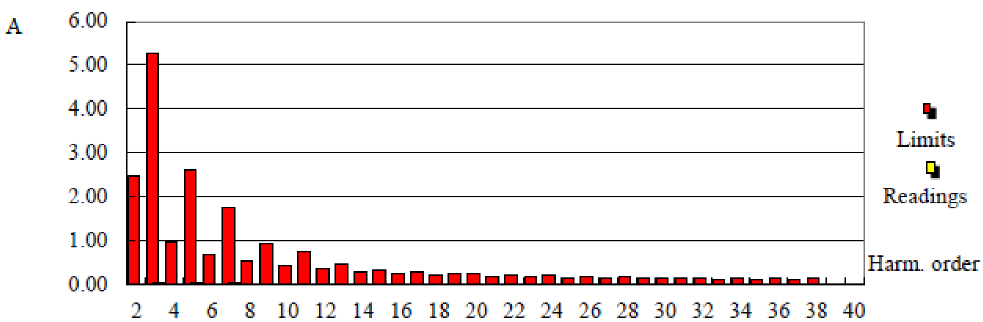
Customer: NEC

Design Phase: **Rev:**

Load Condition: +12V/3.9675A, 12Vsb/0.508A

Standards EN61000-3-2/IEC1000-3-2 **Limit :** Class A **PF :** 0.9822

AC Input 100.26 V, 50.000 Hz, 0.76221 A, 75.0564 Watts.



H#	Reading	Limit	%	Result	H#	Reading	Limit	%	Result
1	0.758780			PASS	21	0.007210	0.245790	2.93%	PASS
2	0.000610	2.477530		PASS	22	0.000170	0.191860		PASS
3	0.034010	5.276220	0.64%	PASS	23	0.006650	0.224410	2.96%	PASS
4	0.001150	0.986420		PASS	24	0.000320	0.175870		PASS
5	0.042780	2.615170	1.64%	PASS	25	0.005580	0.206460	2.70%	PASS
6	0.000940	0.688200		PASS	26	0.000230	0.162350		PASS
7	0.033800	1.766390	1.91%	PASS	27	0.004810	0.191170	2.52%	PASS
8	0.001170	0.527620		PASS	28	0.000220	0.150750		PASS
9	0.021770	0.917600	2.37%	PASS	29	0.003370	0.177980	1.89%	PASS
10	0.001150	0.422100		PASS	30	0.000090	0.140700		PASS
11	0.010580	0.757020	1.40%	PASS	31	0.002570	0.166500	1.54%	PASS
12	0.000930	0.351750		PASS	32	0.000220	0.131910		PASS
13	0.001670	0.481740	0.35%	PASS	33	0.001580	0.156410	1.01%	PASS
14	0.000680	0.301500		PASS	34	0.000310	0.124150		PASS
15	0.001540	0.344100	0.45%	PASS	35	0.001570	0.147470	1.06%	PASS
16	0.000820	0.263810		PASS	36	0.000400	0.117250		PASS
17	0.005860	0.303620	1.93%	PASS	37	0.000130	0.139500	0.09%	PASS
18	0.000470	0.234500		PASS	38	0.000450	0.111080		PASS
19	0.006880	0.271660	2.53%	PASS	39	0.000830	0.132350	0.63%	PASS
20	0.000340	0.211050		PASS	40	0.000230	0.105520		PASS

Test result : PASS

Remark : AC SOURCE:Chroma 6590 POWER ANALYZER: CHROMA-6630

3.1.2 Power Factor Correction

Test condition:

Sample NO.1

AMB.25℃

PFC Test Report

Delta Model No: DPS-1200AB-4A **Rev:** S1F **Date:** 2013/10/1

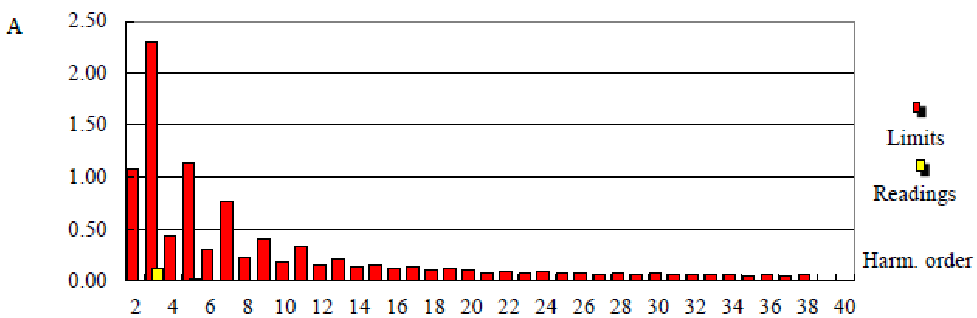
Customer: NEC

Design Phase: **Rev:**

Load Condition: +12V/98A, 12Vsb/2A

Standards EN61000-3-2/IEC1000-3-2 **Limit :** Class A **PF :** 0.9989

AC Input 230.02 V, 50.000 Hz, 5.75204 A, 1321.6935 Watts.



H#	Reading	Limit	%	Result	H#	Reading	Limit	%	Result
1	5.750520			PASS	21	0.002140	0.107140	2.00%	PASS
2	0.008250	1.080000		PASS	22	0.001710	0.083640		PASS
3	0.127110	2.300000	5.53%	PASS	23	0.001690	0.097830	1.73%	PASS
4	0.001500	0.430000		PASS	24	0.001570	0.076670		PASS
5	0.012360	1.140000	1.08%	PASS	25	0.005000	0.090000	5.56%	PASS
6	0.002380	0.300000		PASS	26	0.001730	0.070770		PASS
7	0.004310	0.770000	0.56%	PASS	27	0.006490	0.083330	7.79%	PASS
8	0.001790	0.230000		PASS	28	0.001650	0.065710		PASS
9	0.003570	0.400000	0.89%	PASS	29	0.003510	0.077590	4.52%	PASS
10	0.002400	0.184000		PASS	30	0.002010	0.061330		PASS
11	0.001900	0.330000	0.58%	PASS	31	0.002840	0.072580	3.91%	PASS
12	0.002850	0.153330		PASS	32	0.001370	0.057500		PASS
13	0.001900	0.210000	0.90%	PASS	33	0.006020	0.068180	8.83%	PASS
14	0.002220	0.131430		PASS	34	0.001250	0.054120		PASS
15	0.000300	0.150000	0.20%	PASS	35	0.007280	0.064290	11.32%	PASS
16	0.001930	0.115000		PASS	36	0.000940	0.051110		PASS
17	0.001140	0.132350	0.86%	PASS	37	0.005860	0.060810	9.64%	PASS
18	0.002040	0.102220		PASS	38	0.001470	0.048420		PASS
19	0.004160	0.118420	3.51%	PASS	39	0.005630	0.057690	9.76%	PASS
20	0.001950	0.092000		PASS	40	0.001300	0.046000		PASS

Test result : **PASS**

Remark : AC SOURCE:Chroma 6590 POWER ANALYZER: CHROMA-6630

3.1.2 Power Factor Correction

Test condition:

Sample NO.1

AMB.25℃

PFC Test Report

Delta Model No: DPS-1200AB-4A **Rev:** S1F **Date:** 2013/10/1

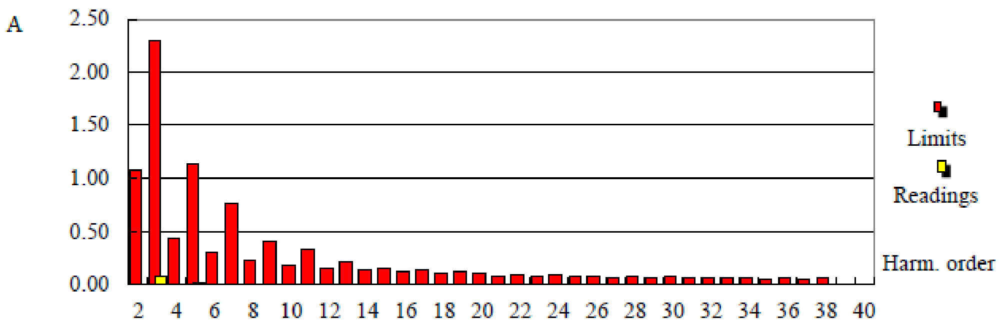
Customer: NEC

Design Phase: **Rev:**

Load Condition: +12V/49A, 12Vsb/1A

Standards EN61000-3-2/IEC1000-3-2 **Limit :** Class A **PF :** 0.9956

AC Input 230.02 V, 50.000 Hz, 2.81478 A, 644.5941 Watts.



H#	Reading	Limit	%	Result	H#	Reading	Limit	%	Result
1	2.813580			PASS	21	0.002700	0.107140	2.52%	PASS
2	0.004440	1.080000		PASS	22	0.001000	0.083640		PASS
3	0.076600	2.300000	3.33%	PASS	23	0.001770	0.097830	1.81%	PASS
4	0.000510	0.430000		PASS	24	0.000960	0.076670		PASS
5	0.012820	1.140000	1.12%	PASS	25	0.003300	0.090000	3.67%	PASS
6	0.001920	0.300000		PASS	26	0.000720	0.070770		PASS
7	0.004520	0.770000	0.59%	PASS	27	0.003740	0.083330	4.49%	PASS
8	0.000830	0.230000		PASS	28	0.000660	0.065710		PASS
9	0.004660	0.400000	1.17%	PASS	29	0.003250	0.077590	4.19%	PASS
10	0.001260	0.184000		PASS	30	0.000840	0.061330		PASS
11	0.003910	0.330000	1.18%	PASS	31	0.004260	0.072580	5.87%	PASS
12	0.000890	0.153330		PASS	32	0.000570	0.057500		PASS
13	0.003260	0.210000	1.55%	PASS	33	0.004830	0.068180	7.08%	PASS
14	0.001710	0.131430		PASS	34	0.000720	0.054120		PASS
15	0.002730	0.150000	1.82%	PASS	35	0.004210	0.064290	6.55%	PASS
16	0.001450	0.115000		PASS	36	0.000440	0.051110		PASS
17	0.001770	0.132350	1.34%	PASS	37	0.003870	0.060810	6.36%	PASS
18	0.001140	0.102220		PASS	38	0.000870	0.048420		PASS
19	0.003950	0.118420	3.34%	PASS	39	0.005040	0.057690	8.74%	PASS
20	0.001240	0.092000		PASS	40	0.000370	0.046000		PASS

Test result : PASS

Remark : AC SOURCE:Chroma 6590 POWER ANALYZER: CHROMA-6630

3.1.2 Power Factor Correction

Test condition:

Sample NO.1

AMB.25℃

PFC Test Report

Delta Model No: DPS-1200AB-4A **Rev:** S1F **Date:** 2013/10/1

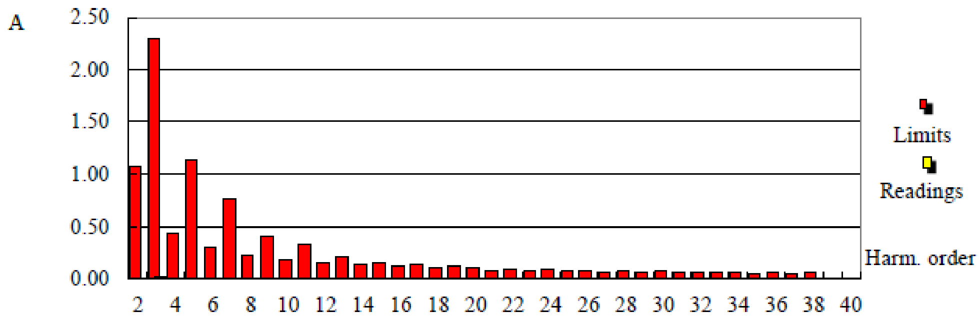
Customer: NEC

Design Phase: **Rev:**

Load Condition: +12V/3.9955A, 12Vsb/0.7181A

Standards EN61000-3-2/IEC1000-3-2 **Limit :** Class A **PF :** 0.8466

AC Input 230.00 V, 50.000 Hz, 0.38528 A, 75.0204 Watts.



H#	Reading	Limit	%	Result	H#	Reading	Limit	%	Result
1	0.384120			PASS	21	0.001490	0.107140	1.39%	PASS
2	0.000390	1.080000		PASS	22	0.000250	0.083640		PASS
3	0.017940	2.300000	0.78%	PASS	23	0.000840	0.097830	0.86%	PASS
4	0.000830	0.430000		PASS	24	0.000120	0.076670		PASS
5	0.010330	1.140000	0.91%	PASS	25	0.001220	0.090000	1.36%	PASS
6	0.000700	0.300000		PASS	26	0.000040	0.070770		PASS
7	0.008240	0.770000	1.07%	PASS	27	0.001330	0.083330	1.60%	PASS
8	0.000500	0.230000		PASS	28	0.000210	0.065710		PASS
9	0.008350	0.400000	2.09%	PASS	29	0.002180	0.077590	2.81%	PASS
10	0.000240	0.184000		PASS	30	0.000270	0.061330		PASS
11	0.003620	0.330000	1.10%	PASS	31	0.004260	0.072580	5.87%	PASS
12	0.000080	0.153330		PASS	32	0.000140	0.057500		PASS
13	0.002790	0.210000	1.33%	PASS	33	0.000250	0.068180	0.37%	PASS
14	0.000300	0.131430		PASS	34	0.000110	0.054120		PASS
15	0.001860	0.150000	1.24%	PASS	35	0.001380	0.064290	2.15%	PASS
16	0.000140	0.115000		PASS	36	0.000190	0.051110		PASS
17	0.002950	0.132350	2.23%	PASS	37	0.000870	0.060810	1.43%	PASS
18	0.000330	0.102220		PASS	38	0.000280	0.048420		PASS
19	0.003150	0.118420	2.66%	PASS	39	0.003530	0.057690	6.12%	PASS
20	0.000460	0.092000		PASS	40	0.000280	0.046000		PASS

Test result : PASS

Remark : AC SOURCE:Chroma 6590 POWER ANALYZER: CHROMA-6630

3.1.3 AC Input Specification

The power supply operates within all specified limits over the following input voltage range at normal temperature condition. Total harmonic distortion of up to 10% does not cause the power supply to go out of specified limits.
Application of an input voltage below 85VAC shall not cause damage to the power supply, including a blown fuse.

Table 1 AC Input Voltage Range

nominal input voltage range of low line	100V-127V
nominal input voltage range of high line	200V-240V
min/max input voltage range of low line	90V-140V
min/max input voltage range of high line	180V-264V
line frequency	47Hz – 63Hz
true RMS input power at full load	230V/1330W; 100V/1170W （ without fan ）
true RMS input power at full load	230V/1345W; 100V/1185W （ with fan ）
apparent power	230V/1400VA; 100V/1231VA(without fan)
apparent power	230V/1416VA; 100V/1247VA(with fan)
crest factor (input current)	< 1.8(50%-100% load)
input RMS current at full load	200V/7A; 100V/12.31A (without fan)
input RMS current at full load	200V/7.08A; 100V/12.47A (with fan)
Start up voltage range(VAC)	85VAC +/- 4VAC
Power off voltage range(VAC)	75VAC +4VAC/ -5VAC

*Short input transients of 285VAC (<1 minute) will not cause any damage to the PSU

Test condition:

Sample : NO.1

Vin : 100Vac/60Hz, 200Vac/50Hz

O/P Load : Max Load

AMB : 0℃, 25℃, 50℃

Numerical Result: PASS

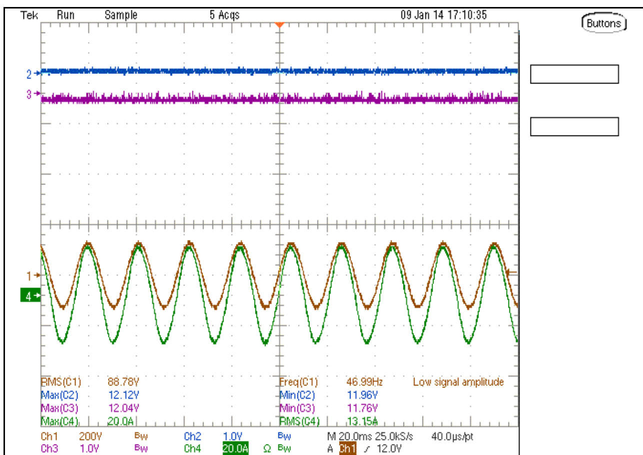
AMB	O/P Load	Input Current Reading (Arms)	
		100Vac/60Hz	200Vac/50Hz
$0^{o}C$	Max	11.426	6.603
$25^{o}C$	Max	11.490	6.635
$50^{o}C$	Max	11.601	6.683
SPEC		12.47 A	7.08 A

※ **ATS TEST**

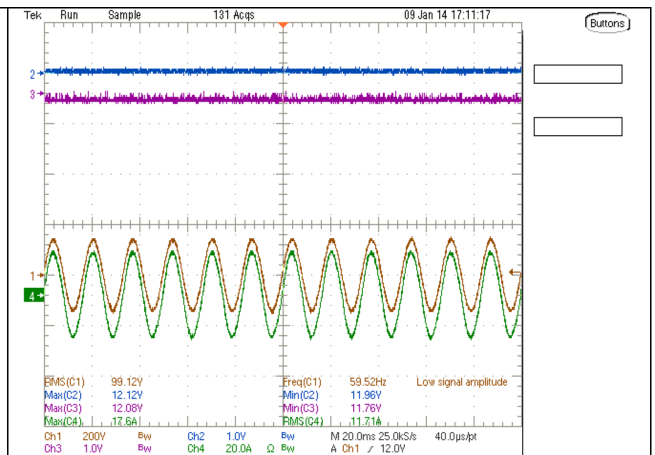
3.1.3 AC Input Specification

Test condition:
Sample NO.1
AMB.25℃
Graphical Result: PASS

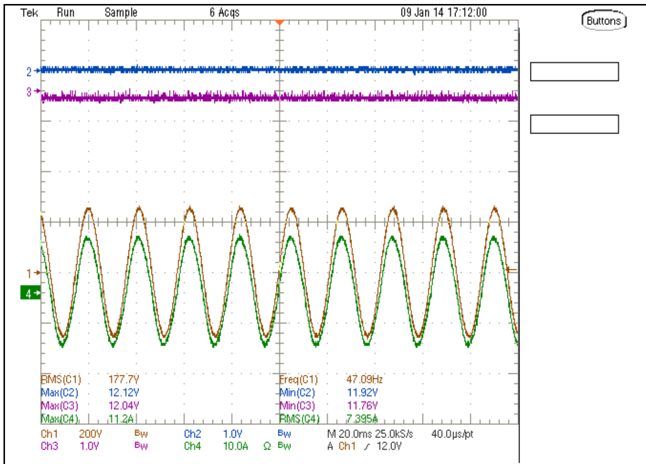
Test Condition	Pout	Ch1(RMS)	Spec (Iin)	Ch4(Iin)	Test Result
Vin Operating Range Frequency test at Vin=90Vac/47Hz and Iout=Max load	1020.227	88.744	*	13.175	PASS
Vin Operating Range Frequency test at Vin=100Vac/60Hz and Iout=Max load	1020.226	99.177	12.470	11.737	PASS
Vin Operating Range Frequency test at Vin=180Vac/47Hz and Iout=Max load	1215.948	177.679	*	7.432	PASS
Vin Operating Range Frequency test at Vin=200Vac/50Hz and Iout=Max load	1215.926	198.622	7.080	6.725	PASS
Vin Operating Range Frequency test at Vin=230Vac/60Hz and Iout=Max load	1215.893	228.346	*	5.783	PASS
Vin Operating Range Frequency test at Vin=264Vac/63Hz and Iout=Max load	1216.211	263.565	*	5.085	PASS



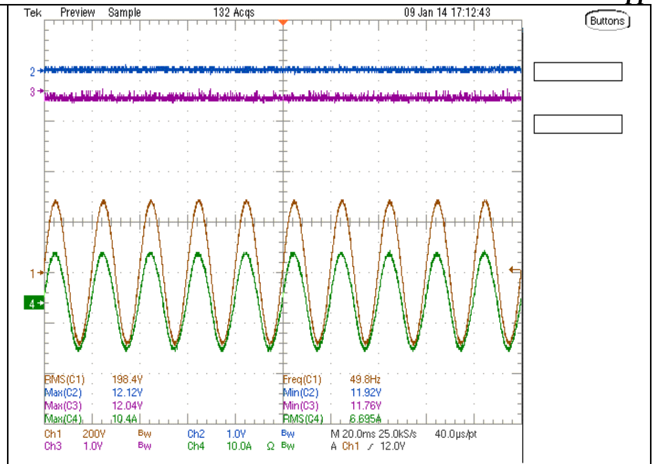
Vin Operating Range Frequency test at Vin=90Vac/47Hz and Iout=Max load
(1) Vin
(2) 12V (Offset 12V)
(3) 12Vsb (Offset 12V)
(4) Vin Current



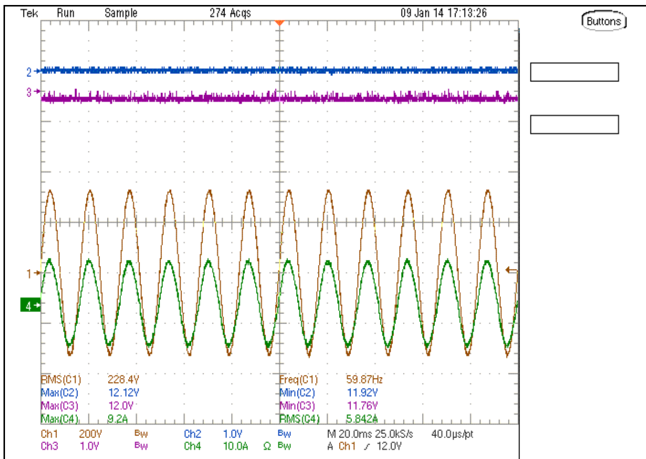
Vin Operating Range Frequency test at Vin=100Vac/60Hz and Iout=Max load
(1) Vin
(2) 12V (Offset 12V)
(3) 12Vsb (Offset 12V)
(4) Vin Current



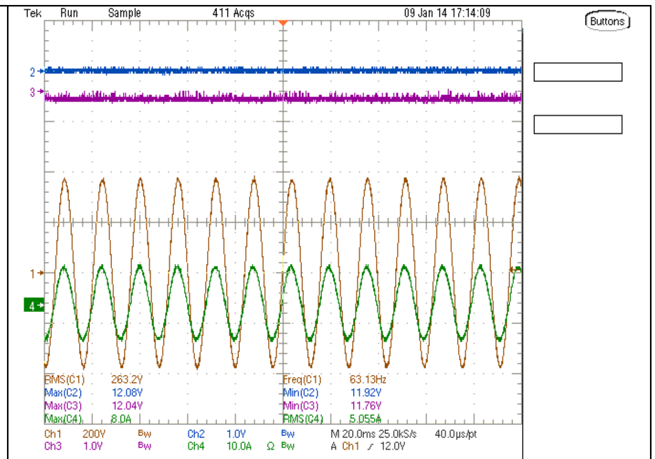
Vin Operating Range Frequency test at Vin=180Vac/47Hz and Iout=Max load
(1) Vin
(2) 12V (Offset 12V)
(3) 12Vsb (Offset 12V)
(4) Vin Current



Vin Operating Range Frequency test at Vin=200Vac/50Hz and Iout=Max load
(1) Vin
(2) 12V (Offset 12V)
(3) 12Vsb (Offset 12V)
(4) Vin Current



Vin Operating Range Frequency test at Vin=230Vac/60Hz and Iout=Max load
(1) Vin
(2) 12V (Offset 12V)
(3) 12Vsb (Offset 12V)
(4) Vin Current



Vin Operating Range Frequency test at Vin=264Vac/63Hz and Iout=Max load
(1) Vin
(2) 12V (Offset 12V)
(3) 12Vsb (Offset 12V)
(4) Vin Current

3.1.3 AC Input Specification

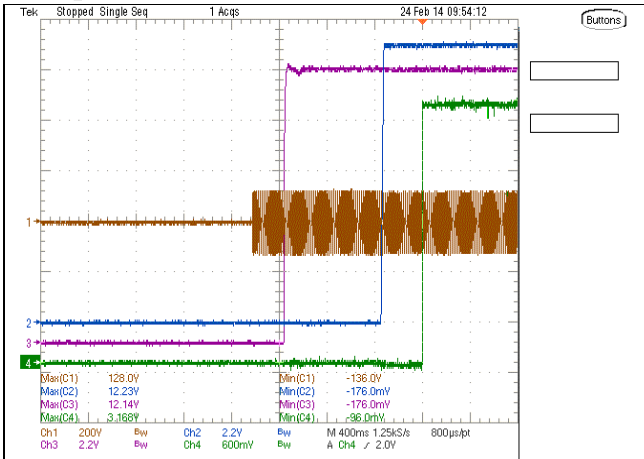
Test conditions:

Sample NO.1

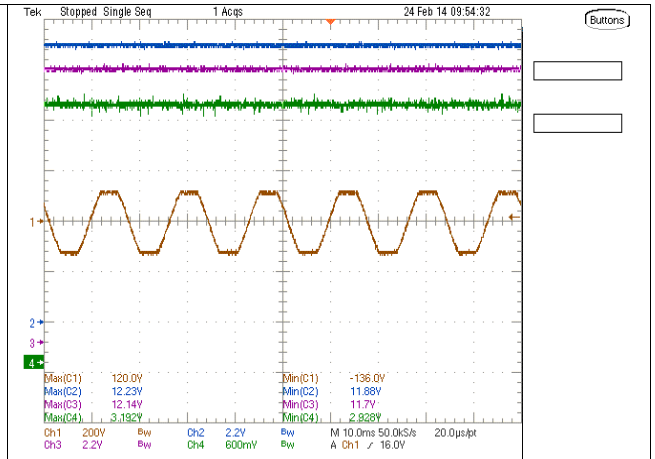
AMB.25℃

Test 1	100V/60Hz	THD 10% start up; I/P:100Vac,O/P for Max Load
Test 2	100V/60Hz	THD 10% Continuous; I/P:100Vac,O/P for Max Load
Test 3	100V/60Hz	THD 10% start up; I/P:100Vac,O/P for Min Load
Test 4	100V/60Hz	THD 10% Continuous; I/P:100Vac,O/P for Min Load

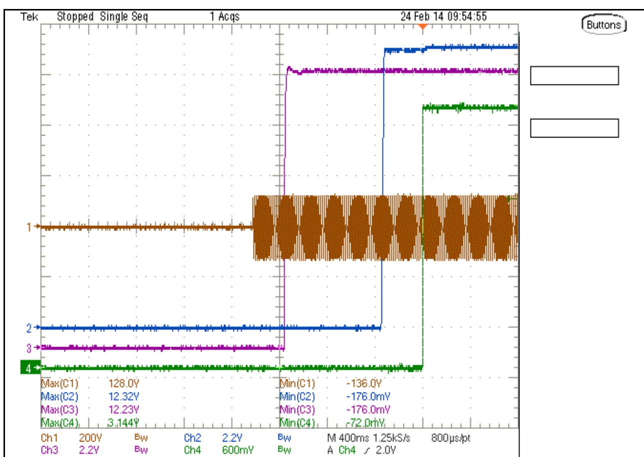
Graphical Result: PASS



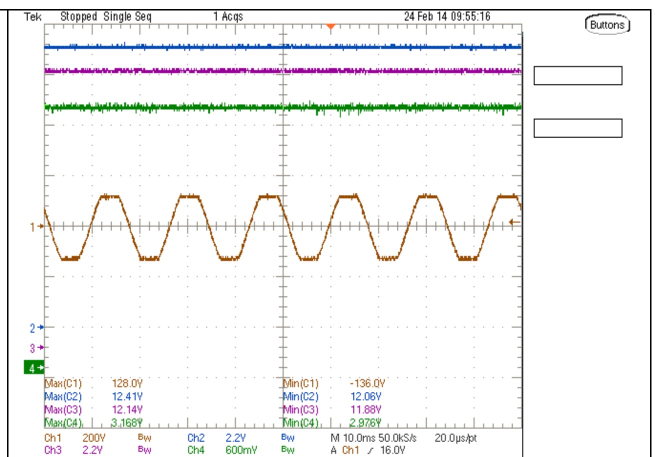
THD 10% start up; I/P:100Vac,O/P for Max Load
(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK



THD 10% Continuous; I/P:100Vac,O/P for Max Load
(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK



THD 10% start up; I/P:100Vac,O/P for Min Load
(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK



THD 10% Continuous; I/P:100Vac,O/P for Min Load
(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK

3.1.3 AC Input Specification

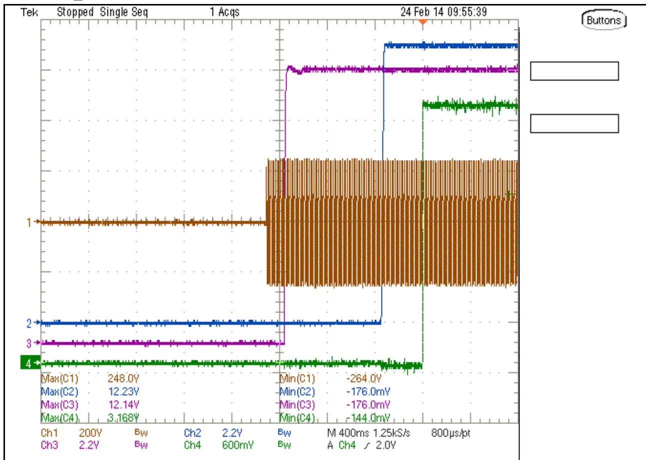
Test conditions:

Sample NO.1

AMB.25℃

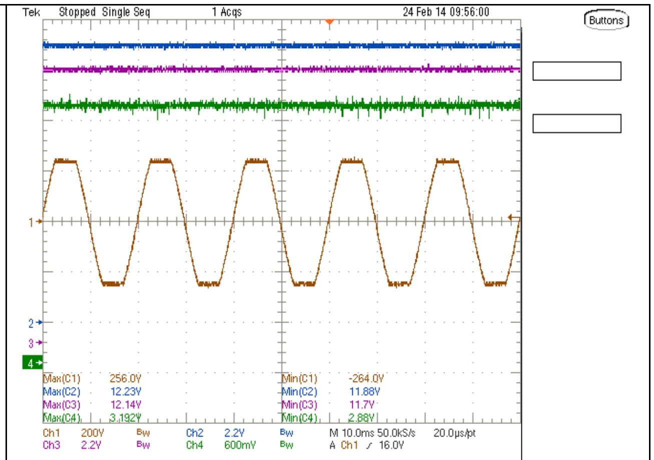
Test 1	200V/50Hz	THD 10% start up; I/P:200Vac,O/P for Max Load
Test 2	200V/50Hz	THD 10% Continuous; I/P:200Vac,O/P for Max Load
Test 3	200V/50Hz	THD 10% start up; I/P:200Vac,O/P for Min Load
Test 4	200V/50Hz	THD 10% Continuous; I/P:200Vac,O/P for Min Load

Graphical Result: PASS



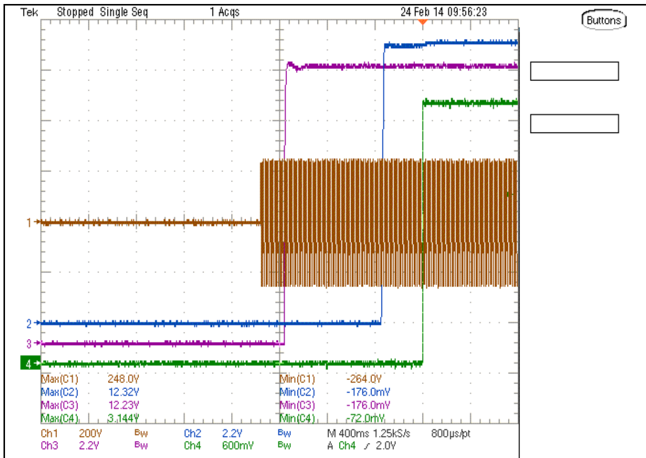
THD 10% start up; I/P:200Vac,O/P for Max Load

(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK



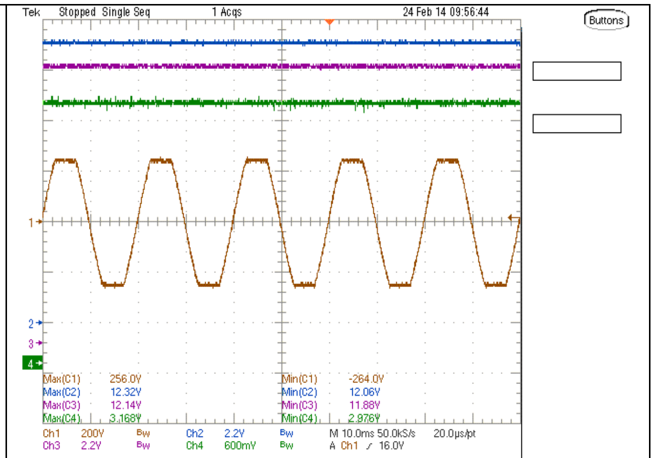
THD 10% Continuous; I/P:200Vac,O/P for Max Load

(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK



THD 10% start up; I/P:200Vac,O/P for Min Load

(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK



THD 10% Continuous; I/P:200Vac,O/P for Min Load

(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK

3.1.3 AC Input Specification

Test conditions:

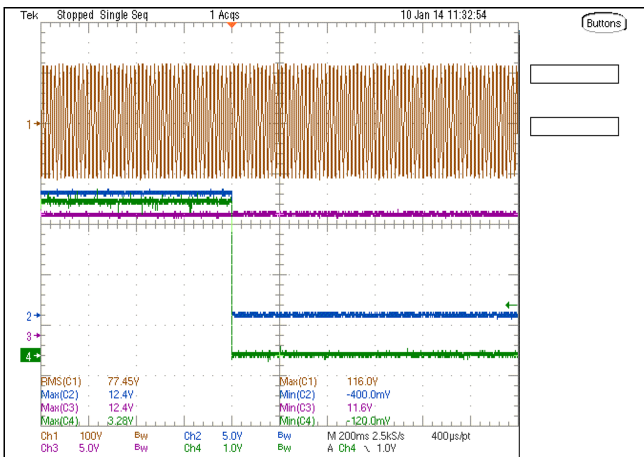
Sample NO.1

AMB. 25℃

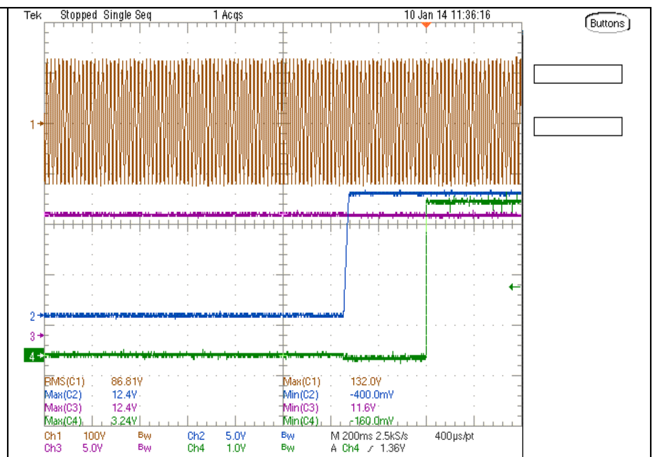
1. Voltage ramps down starting from 90VAC, +12V/0.5A, +12Vsb/0.05A
2. Voltage ramps down starting from 90VAC, +12V/82A, +12Vsb/2A
3. Voltage ramps up starting from 0.0 VAC, +12V/0.5A, +12Vsb/0.05A
4. Voltage ramps up starting from 0.0 VAC, +12V/82A, +12Vsb/2A

Graphical Result: PASS

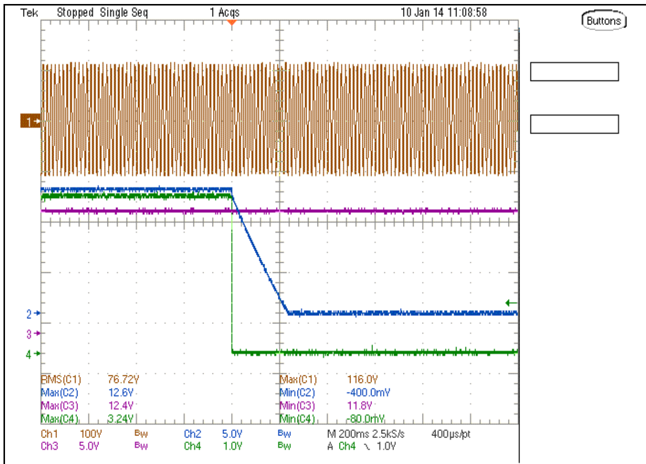
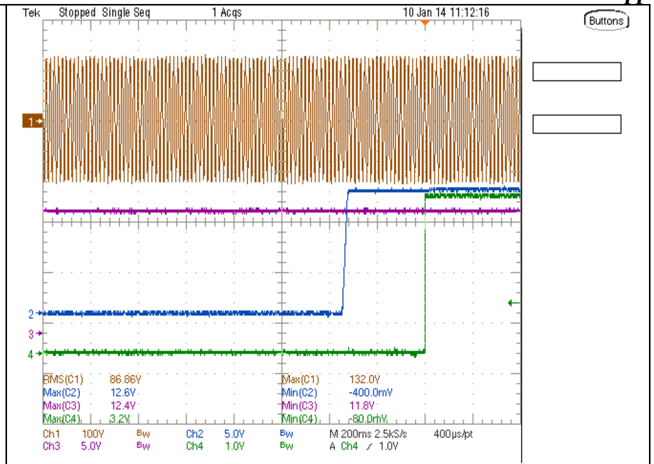
Test Condition	Max Spec	Min Spec	Max	Test Result
90Vac Max Load shutdown	79	71	77.45	PASS
90Vac Max Load Recovery	89	81	86.81	PASS
90Vac Min Load shutdown	79	71	76.72	PASS
90Vac Min Load Recovery	89	81	86.86	PASS



90Vac Max Load shutdown
(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK



90Vac Max Load Recovery
(1) Vin
(2) 12V
(3) 12Vsb
(4) PWOK

	
90Vac Min Load shutdown (1) Vin (2) 12V (3) 12Vsb (4) PWOK	90Vac Min Load Recovery (1) Vin (2) 12V (3) 12Vsb (4) PWOK

3.1.4 Efficiency

This power supplies for power distribution (+12V/+12VSB) have a minimum efficiency according table at 25 deg condition stated in this document (meet EPA and CSCI definition). At zero load condition the PSU must have minimized losses. The fan losses are not included in the efficiency calculation and measurements. In parallel mode a special output control circuit ensures that the unit is running at its pre-defaulted efficiency working point.

Table 2: Efficiency

	10% Load	20% Load	50% Load	100% Load
230VAC/ 50Hz	85%	90%	94%	91%

Test conditions:

Sample NO.1

Vin : 230Vac/50Hz

O/P Load : 10%, 20%, 50%, 100% Load

AMB : 0oC, 25℃, 50oC

Numerical Result: PASS

25°C

AC Condition	O/P Load	Vin	Iin	PF	Pin	Pout	Efficiency (%)	SPEC
115Vac / 60Hz	10%	115.200	1.042	0.989	118.684	101.649	85.647	
	20%	115.250	1.979	0.991	226.027	203.019	89.821	
	50%	115.390	4.798	0.995	550.873	505.838	91.825	
	100%	115.660	9.780	0.999	1130.024.	1010.845	89.453	
230Vac / 50Hz	10%	230.260	0.640	0.938	138.294	122.103	88.292	85%
	20%	230.310	1.173	0.977	263.918	243.688	92.335	90%
	50%	230.390	2.829	0.991	645.907	608.196	94.162	94%
	100%	230.560	5.751	0.996	1320.647	1213.593	91.894	91%

Need test at 0deg/50deg only for reference.

0°C

AC Condition	O/P Load	Vin	Iin	PF	Pin	Pout	Efficiency (%)	SPEC
115Vac / 60Hz	10%	115.190	1.044	0.989	118.936	101.653	85.469	
	20%	115.240	1.981	0.991	226.236	203.111	89.779	
	50%	115.380	4.793	0.995	550.251	505.780	91.981	
	100%	115.660	9.736	0.999	1124.940	1011.119	89.882	
230Vac / 50Hz	10%	230.240	0.642	0.937	138.437	122.209	88.278	85%
	20%	230.330	1.174	0.976	264.008	243.686	92.303	90%
	50%	230.330	2.829	0.991	645.739	608.697	94.264	94%
	100%	230.510	5.726	0.996	1314.621	1213.600	92.316	91%

※ ATS TEST

50°C

AC Condition	O/P Load	Vin	Iin	PF	Pin	Pout	Efficiency (%)	SPEC
115Vac / 60Hz	10%	115.200	1.047	0.990	119.374	101.535	85.056	
	20%	115.220	1.987	0.991	226.882	202.877	89.420	
	50%	115.370	4.824	0.995	553.762	505.696	91.320	
	100%	115.640	9.863	0.999	1139.417	1010.422	88.679	
230Vac / 50Hz	10%	230.120	0.645	0.940	139.543	122.122	87.516	85%
	20%	230.230	1.193	0.978	268.644	243.560	90.663	90%
	50%	230.290	2.849	0.992	650.847	607.205	93.295	94%
	100%	230.530	5.972	0.997	1331.224	1213.051	91.123	91%

※ ATS TEST

3.1.4 Efficiency

Test conditions:

Sample NO.1

AMB. 25℃

Numerical Result: PASS

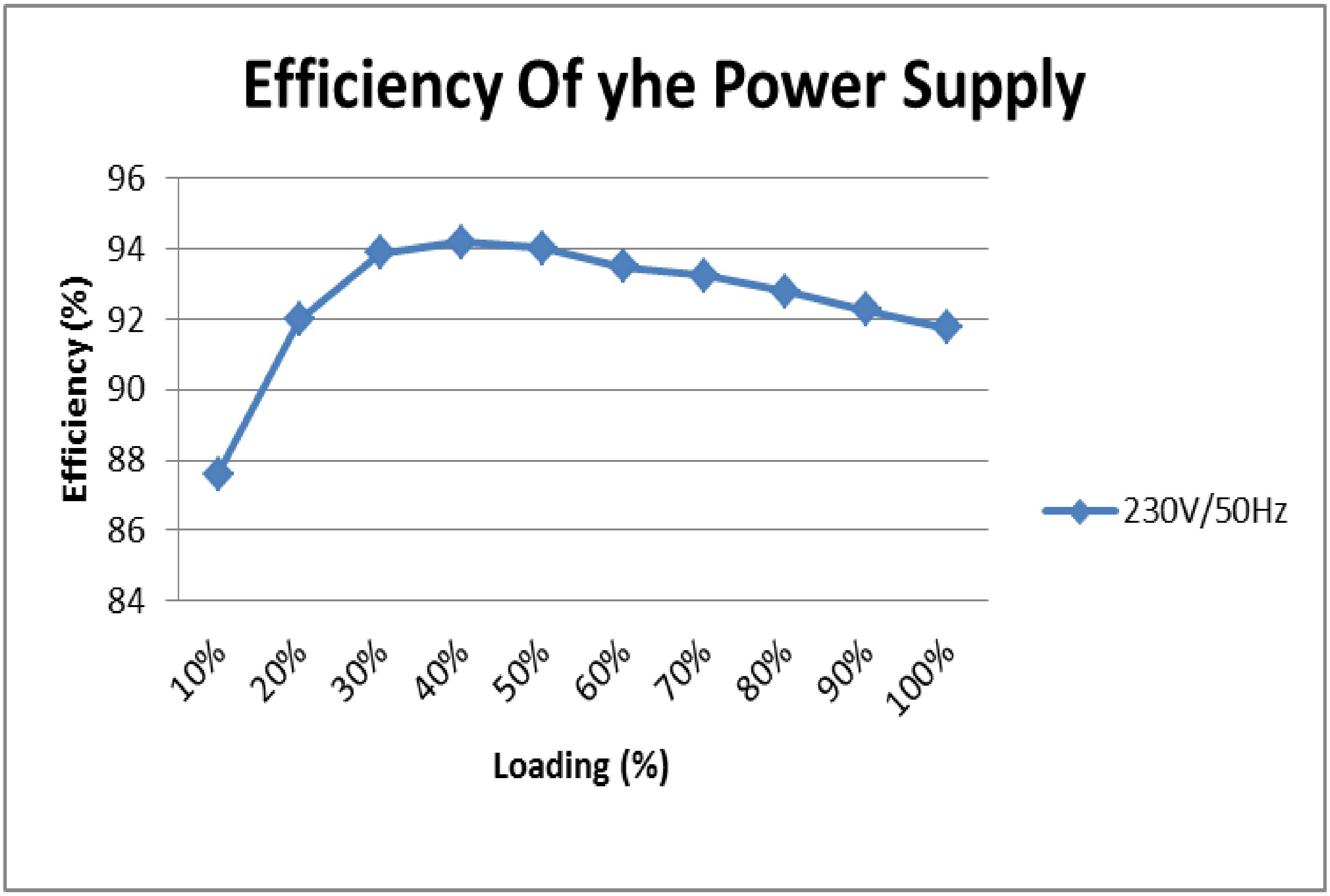
Serial_No	LOAD	Vin/Freq	Iinrms(A)	Pin	Pdc	Dissipated Power	EFF	PF
1	10%	230V/50Hz	0.64	138.3	121.14	17.157	87.594	0.939
	20%		1.174	263.4	242.25	21.153	91.969	0.975
	30%		1.717	388.2	364.45	23.753	93.881	0.983
	40%		2.273	516.88	486.79	30.086	94.179	0.989
	50%		2.84	646.45	607.68	38.769	94.003	0.99
	60%		3.423	779.42	728.69	50.732	93.491	0.991
	70%		3.998	912.33	850.51	61.819	93.224	0.993
	80%		4.585	1047.37	971.96	75.406	92.8	0.995
	90%		5.185	1185.47	1093.65	91.823	92.254	0.996
	100%		5.794	1325.18	1215.97	109.21	91.759	0.997

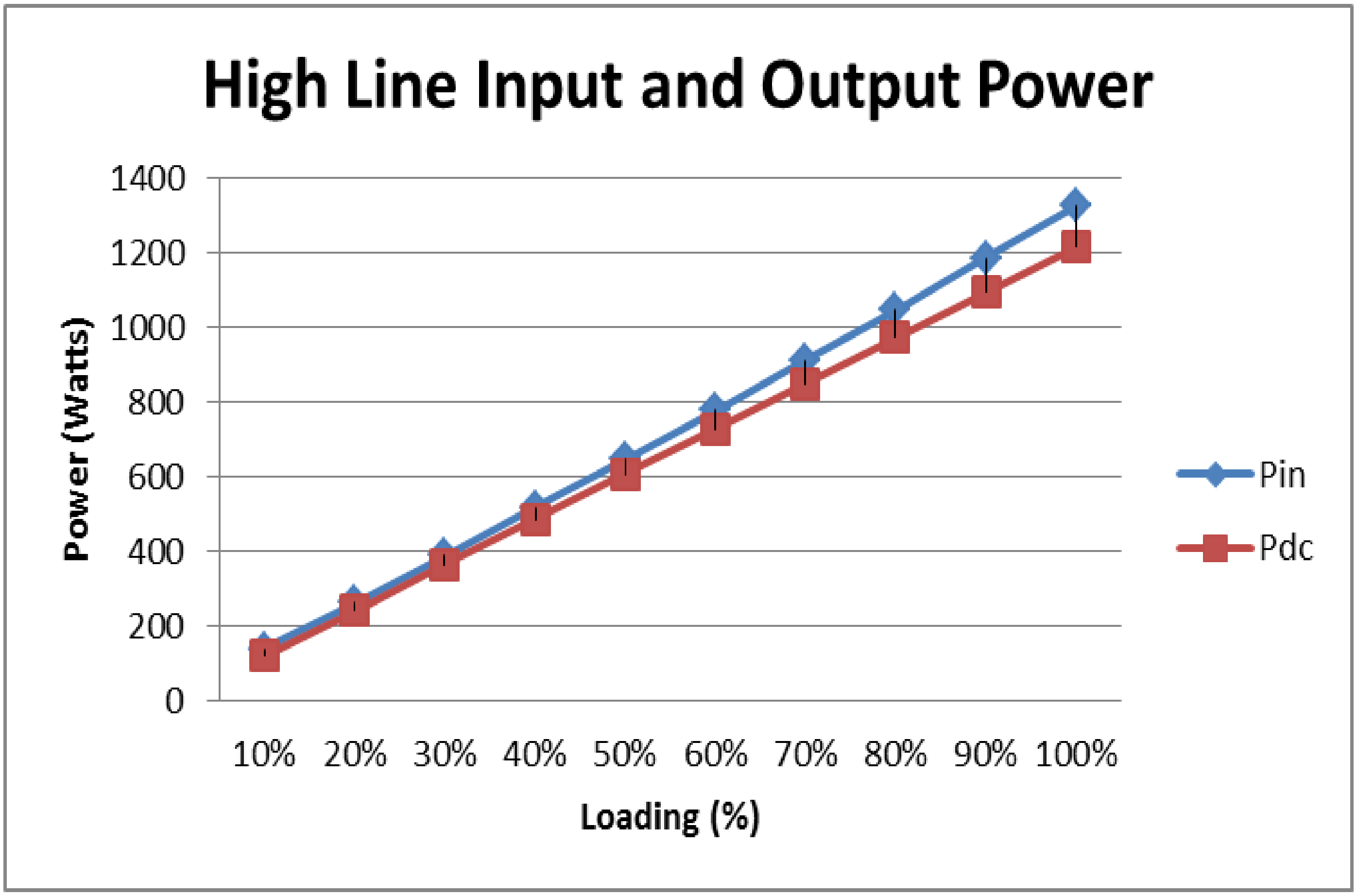
3.1.4 Efficiency

Test conditions:

Sample NO.1

AMB. 25℃




High Line Input and Output Power
Power (Watts)
1400
1200
1000
800
600
400
200
0
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Loading (%)
Pin
Pdc

3.1.5 AC Line Inrush Current

When input power is applied to the power supply and any initial current surge (up to one-quarter of the AC cycle) or spike of 10ms or less will not exceed 55A peak at cold start. Any additional inrush current surges or spikes in the form of AC cycles or multiple AC cycles greater than 10ms and less than 150ms must not exceed 50A peak. After 150 ms the AC input current must meet the requirements in Section 0. The PSU must meet inrush requirements for any rated AC voltage, during turn ON at any phase of AC voltage and over the specified temperature range. The inrush must be less than the ratings of the critical components. Inrush current caused by x- or y-caps is not considered.

3.1.5 AC Line Inrush Current

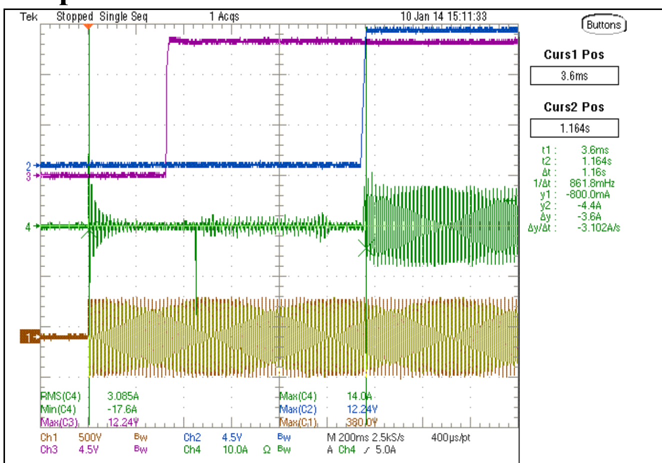
Test conditions:

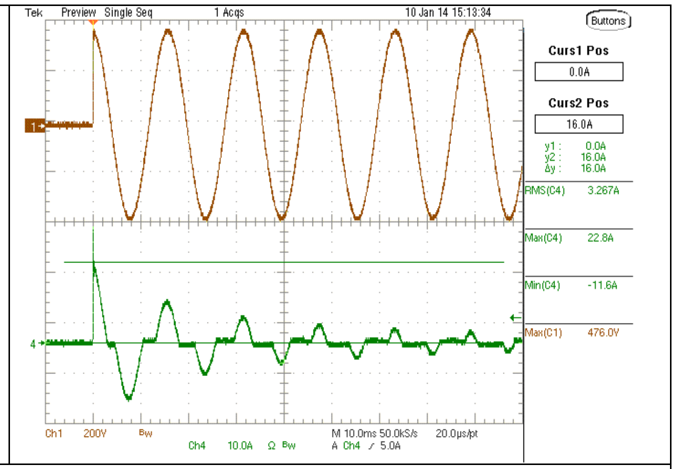
Sample NO.1

AMB. 25℃

Max Load: +12V/98A, +12Vsb/2A

Graphical Result: PASS





Test condition: 264VAC / 90° /Max load/cold start
CH1: AC I/P
CH2: +12V
CH3:+12Vsb
CH4: Inrush current
RMS Current between cursors: 16Arms
Measured Interval: 3.2 mS.
I2t calculation: $1/2 * (I_{peak})^2 * t$; $1/2 * 16 * 16 * 0.0032 = 0.4096$ A2s

3.1.5 AC Line Inrush Current

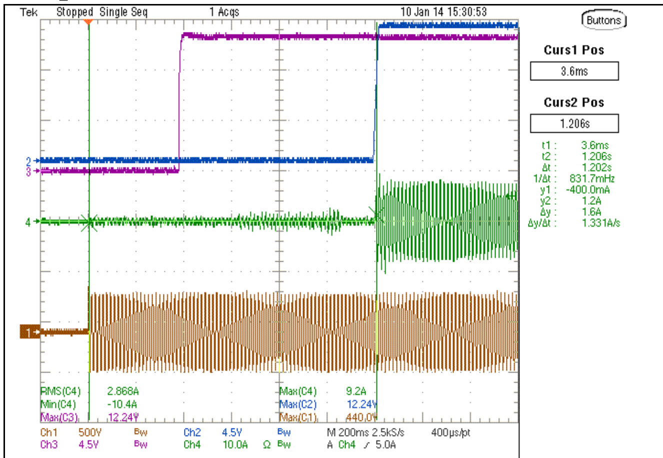
Test conditions:

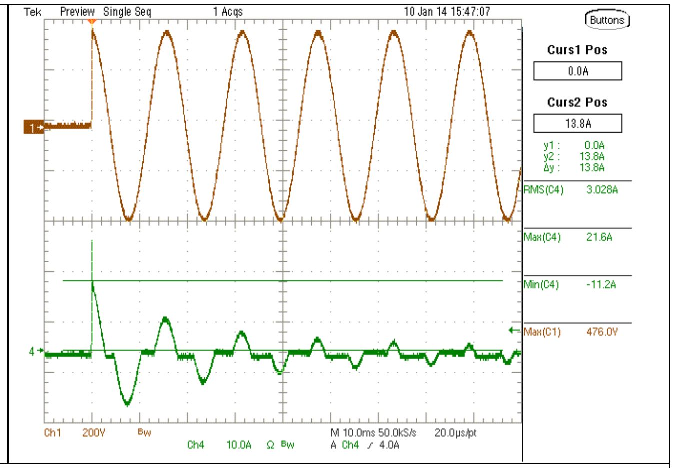
Sample NO.1

AMB. 25℃

Max Load: +12V/98A, +12Vsb/2A

Graphical Result: PASS





Test condition: 264VAC / 90° /Max load/hot start
CH1: AC I/P
CH2: +12V
CH3:PWOK
CH4: Inrush current
RMS Current between cursors: 13.8Arms
Measured Interval: 3.2mS.
I2t calculation: $1/2 * (I_{peak})^2 * t$; 1/2 * 13.8 * 13.8 * 0.0032 = 0.304704A2s

3.1.5 AC Line Inrush Current

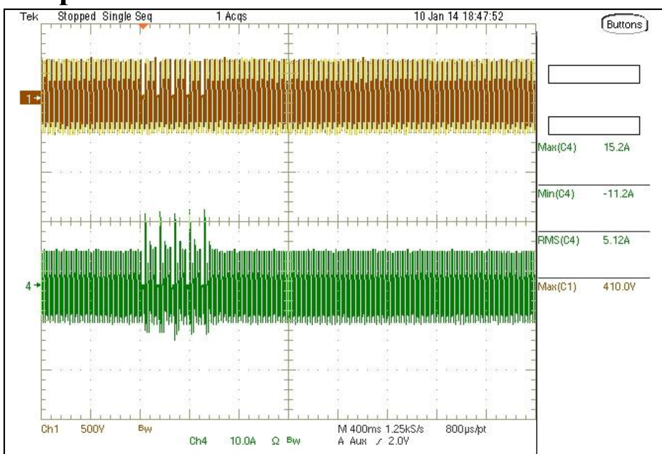
Test conditions:

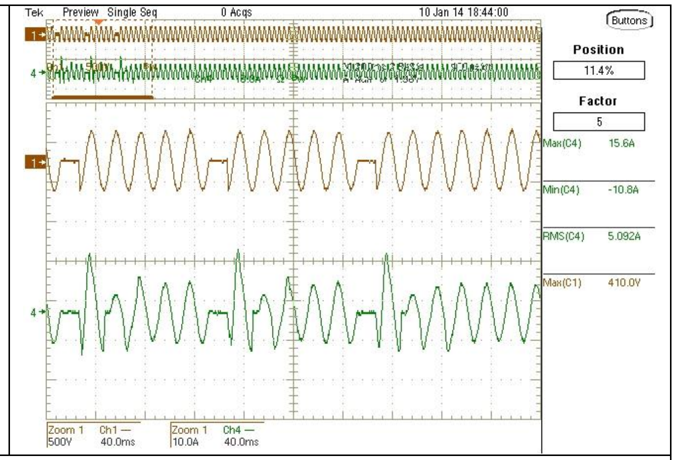
Sample NO.1

AMB. 25℃

Max Load: +12V/98A, +12Vsb/2A

Graphical Result: PASS





Test condition: AC Line dropout repeat 5 times
CH1: AC I/P
CH4: Inrush current

3.1.5 AC Line Inrush Current

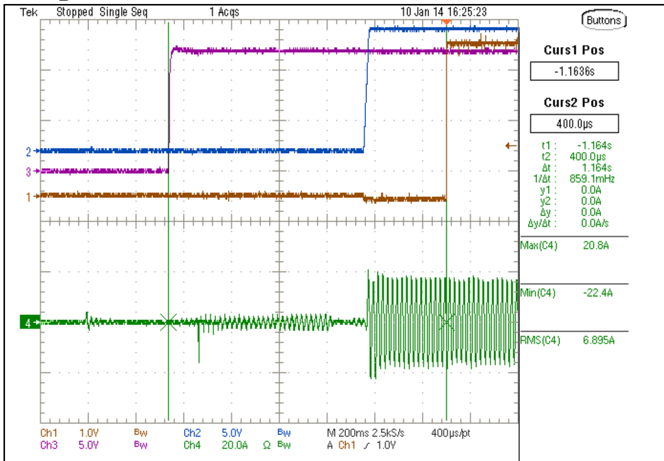
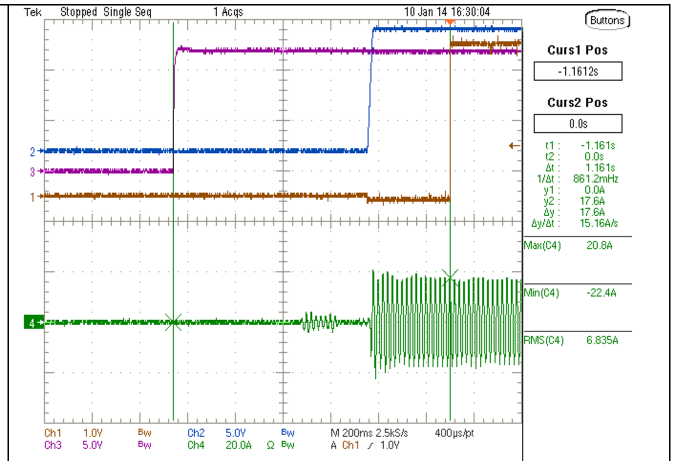
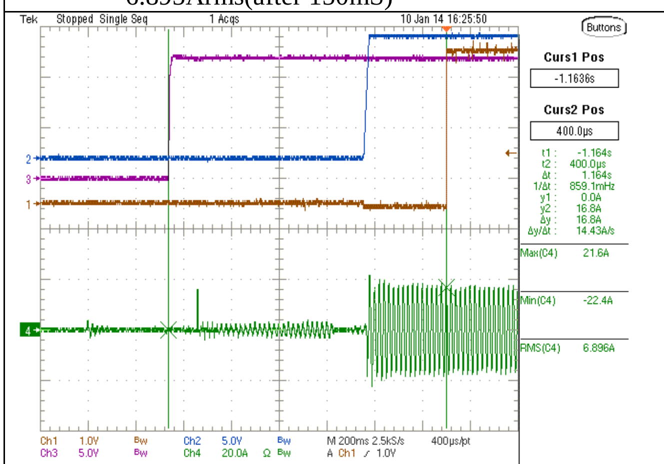
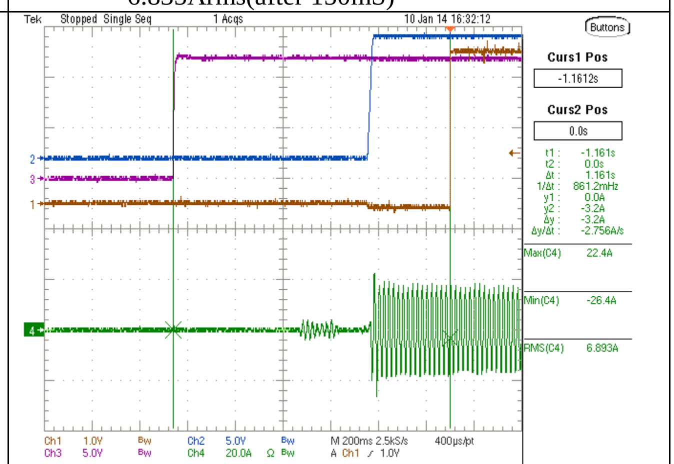
Test conditions:

Sample NO.1

AMB. 25℃

Max Load: +12V/82A, +12Vsb/2A

Graphical Result: PASS

<table>
<tr><td>
</td><td>
</td></tr>
<tr><td>Test condition: 100V/ 0° / Cold start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 20.8A max(10mS~150mS)
6.895Arms(after 150mS)</td><td>Test condition: 100V/ 0° / Hot start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 20.8A max(10mS~150mS)
6.835Arms(after 150mS)</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Test condition: 100V/ 45° / Cold start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 21.6A max(10mS~150mS)
6.896Arms(after 150mS)</td><td>Test condition: 100V/ 45° / Hot start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 22.4A max(10mS~150mS)
6.893Arms(after 150mS)</td></tr>
</table>

3.1.5 AC Line Inrush Current

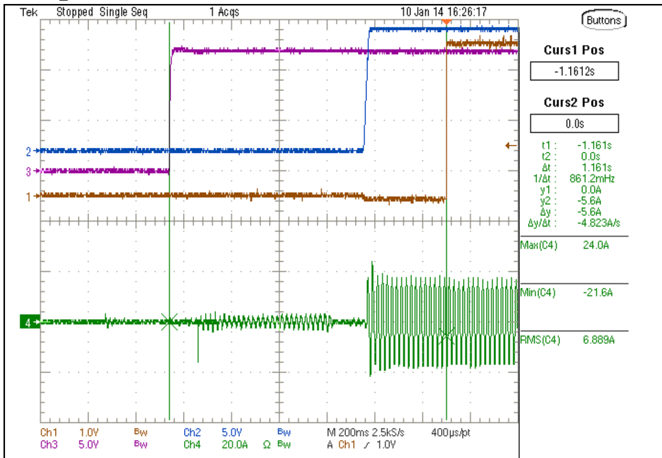
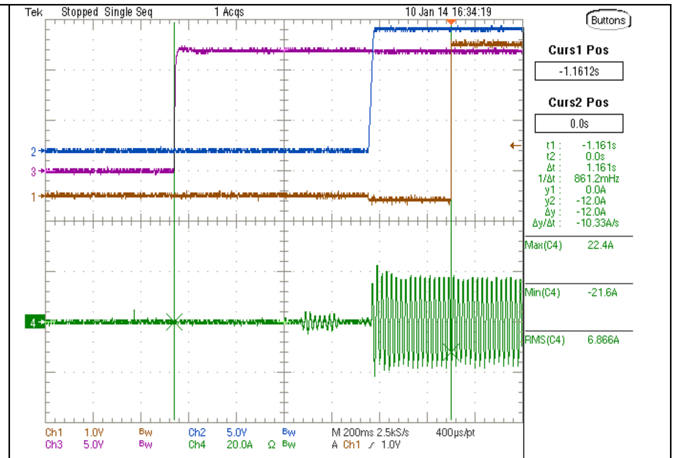
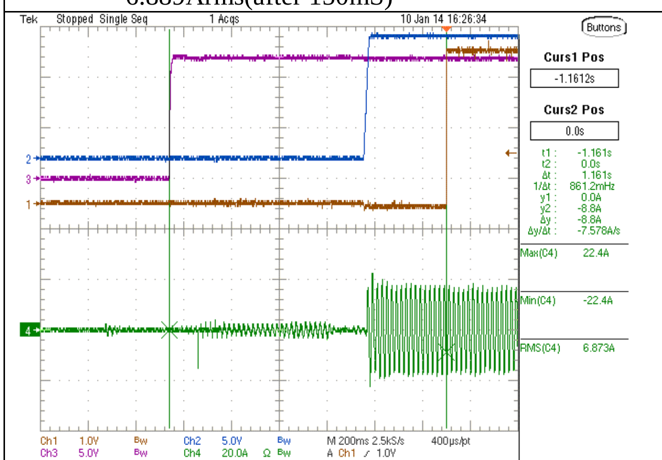
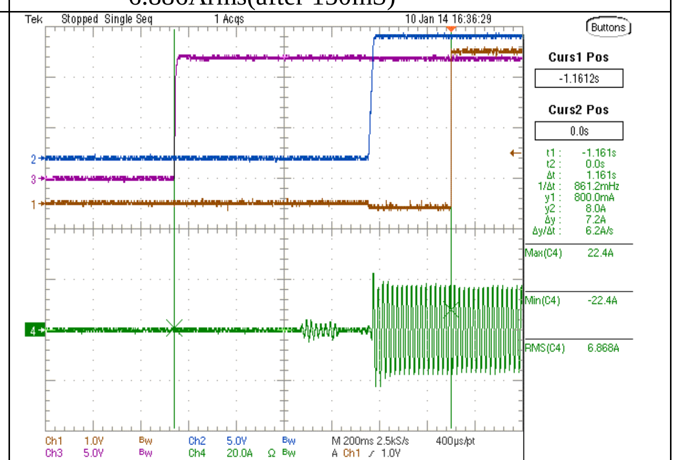
Test conditions:

Sample NO.1

AMB. 25℃

Max Load: +12V/82A, +12Vsb/2A

Graphical Result: PASS

	
Test condition: 100V/ 90° / Cold start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement. Reading: 24.0A max(10mS~150mS) 6.889Arms(after 150mS)	Test condition: 100V/ 90° / Hot start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement. Reading: 22.4A max(10mS~150mS) 6.886Arms(after 150mS)
	
Test condition: 100V/ 135° / Cold start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement. Reading: 22.4A max(10mS~150mS) 6.873Arms(after 150mS)	Test condition: 100V/ 135° / Hot start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement. Reading: 22.4A max(10mS~150mS) 6.868Arms(after 150mS)

3.1.5 AC Line Inrush Current

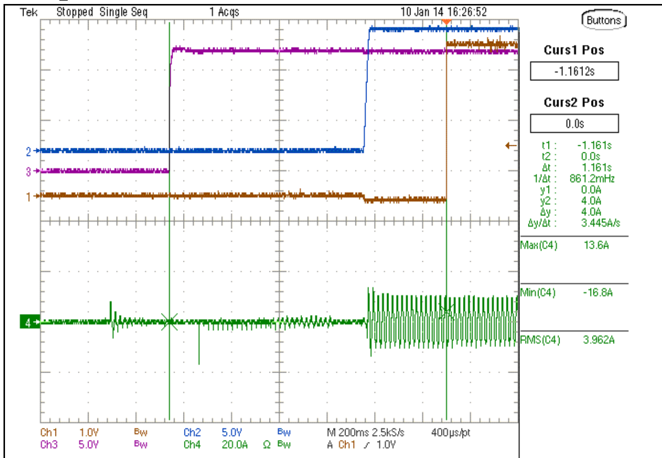
Test conditions:

Sample NO.1

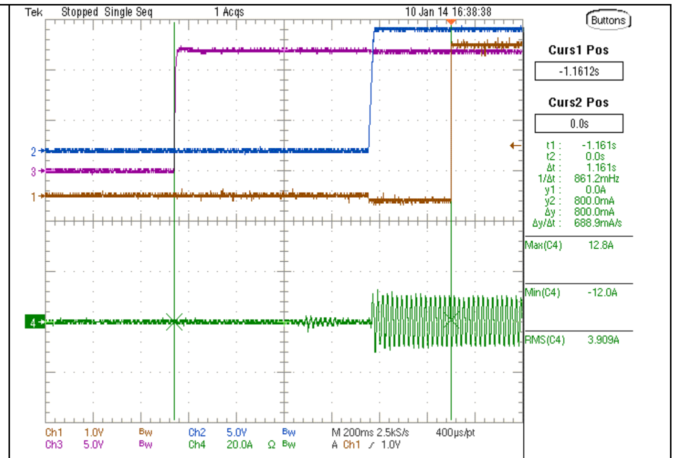
AMB. 25℃

Max Load: +12V/98A, +12Vsb/2A

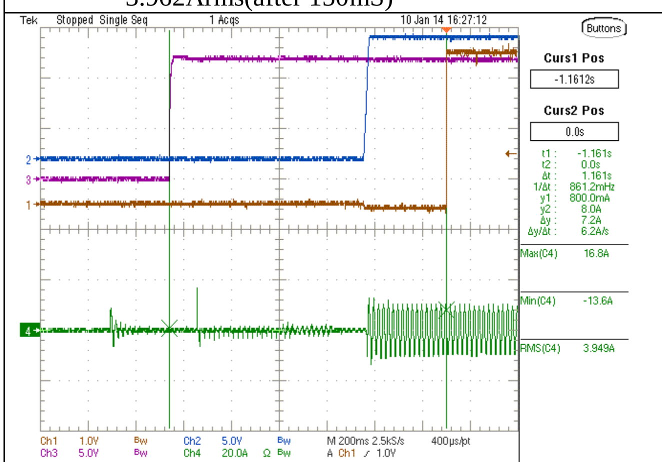
Graphical Result: PASS



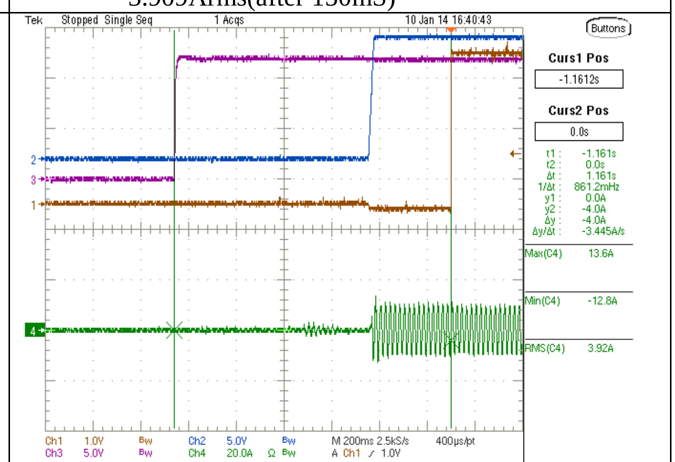
Test condition: 200V/ 0° / Cold start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 13.6A max(10mS~150mS)
3.962Arms(after 150mS)



Test condition: 200V/ 0° / Hot start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 12.8A max(10mS~150mS)
3.909Arms(after 150mS)



Test condition: 200V/ 45° / Cold start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 16.8A max(10mS~150mS)
3.949Arms(after 150mS)



Test condition: 200V/ 45° / Hot start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 13.6A max(10mS~150mS)
3.92Arms(after 150mS)

3.1.5 AC Line Inrush Current

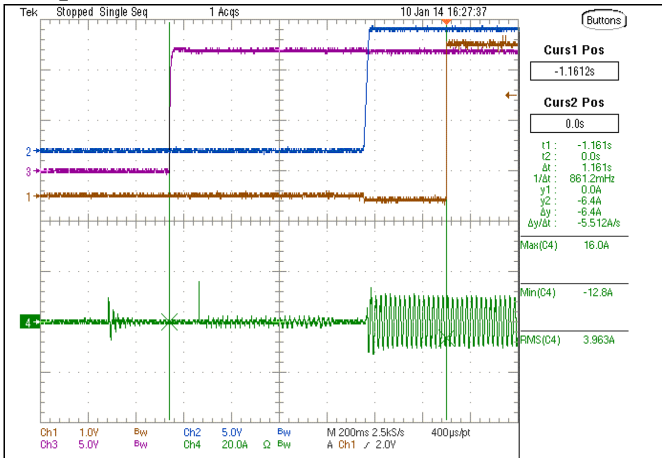
Test conditions:

Sample NO.1

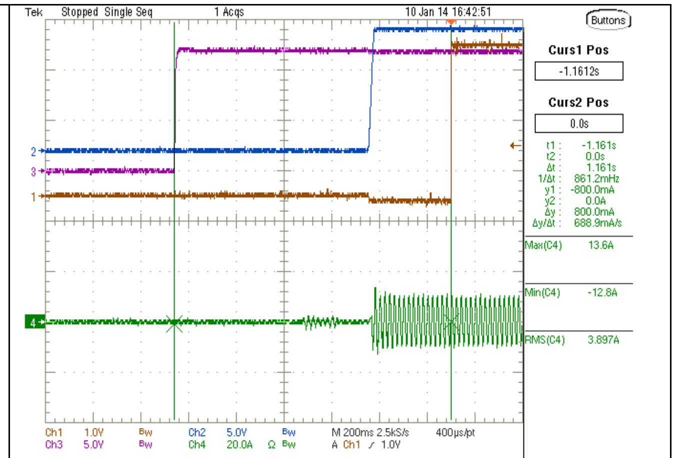
AMB. 25℃

Max Load: +12V/98A, +12Vsb/2A

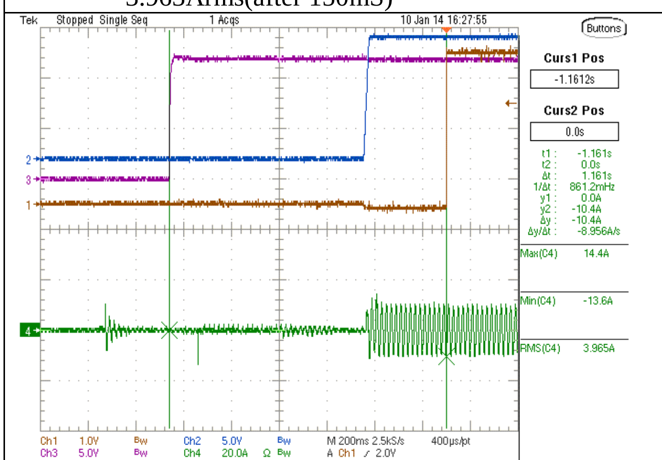
Graphical Result: PASS



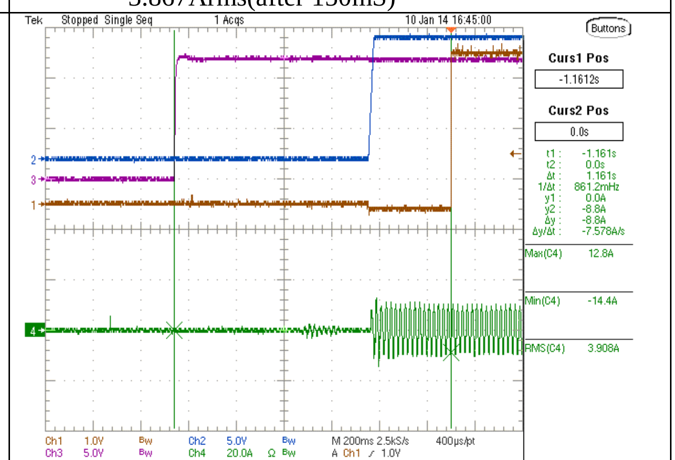
Test condition: 200V/ 90° / Cold start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 16.0A max(10mS~150mS)
3.963Arms(after 150mS)



Test condition: 200V/ 90° / Hot start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 13.6A max(10mS~150mS)
3.867Arms(after 150mS)



Test condition: 200V/ 135° / Cold start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 14.4A max(10mS~150mS)
3.965Arms(after 150mS)



Test condition: 200V/ 135° / Hot start / 10mS~150mS, must not exceed 50 peak. After 150mS the AC input current must meet the requirement.
Reading: 12.8A max(10mS~150mS)
3.908Arms(after 150mS)

3.1.6 AC Leakage Current

The maximum leakage current to protective earth is <0.875mA measured at 240VAC, 50Hz.

Test condition:
INPUT: 240V
LOAD: Dummy load

Test Result: PASS

Sample NO	Reading
NO.1	L-->FG : 0.720mA
	N-->FG : 0.800mA

3.1.7 Line Fuse

The power supply has a 16A fast blow type fuse**.** AC line fuse must be accepted by all safety agencies. AC inrush current does not cause the ac line fuse to blow under any condition. All protection circuits in the power supply do not cause the ac fuse to blow unless a component in the power supply has failed. This includes dc output load short conditions.

3.1.8 AC Line Dropout

An ac line dropout is defined to be when the ac input drops to 0VAC at any phase of the ac line for any length of time. During an ac dropout the power supply must meets dynamic voltage regulation requirements. An AC line dropout does not cause any tripping of control signals or protection circuits. If the ac dropout lasts longer than the hold up time the power supply should recovers and meets all turn on requirements. The power supply meets the ac dropout requirement over rated ac voltages, frequencies, and output loading conditions. Any dropout of the ac line does not cause damage to the power supply.

Table 3: AC Line Dropout

Loading	Holdup time
100%	12msec
50%	10msec

3.1.8 AC Line Dropout

Test conditions:

Sample NO.1

Vin : 90Vac/60Hz, 264Vac/50Hz

O/P Load : 50%, 100% Load

AMB : 0oC, 25℃, 50oC

Numerical Result: PASS

AMB	AC Condition	O/P Load	Cycle DropOut (V)			
			12Vdc(H)	12Vdc(L)	12Vsb(H)	12Vsb(L)
0^oC	90Vac to 0Vac (10ms)	50%	12.281	12.125	11.968	11.956
	90Vac to 0Vac (12ms)	100%	12.293	12.112	11.925	11.912
	264Vac to 0Vac (10ms)	50%	12.275	12.118	11.968	11.956
	264Vac to 0Vac (12ms)	100%	12.293	12.112	11.918	11.912
25^oC	90Vac to 0Vac (10ms)	50%	12.256	12.125	12.006	12.000
	90Vac to 0Vac (12ms)	100%	12.281	12.112	11.956	11.950
	264Vac to 0Vac (10ms)	50%	12.256	12.118	12.006	12.000
	264Vac to 0Vac (12ms)	100%	12.281	12.112	11.956	11.943
50^oC	90Vac to 0Vac (10ms)	50%	12.262	12.112	12.043	12.031
	90Vac to 0Vac (12ms)	100%	12.275	12.106	11.987	11.975
	264Vac to 0Vac (10ms)	50%	12.262	12.118	12.043	12.031
	264Vac to 0Vac (12ms)	100%	12.275	12.106	11.981	11.968
SPEC			11.64V ~ 12.36V		11.64V ~ 12.36V	

※ **ATS TEST**

3.1.8 AC Line Dropout

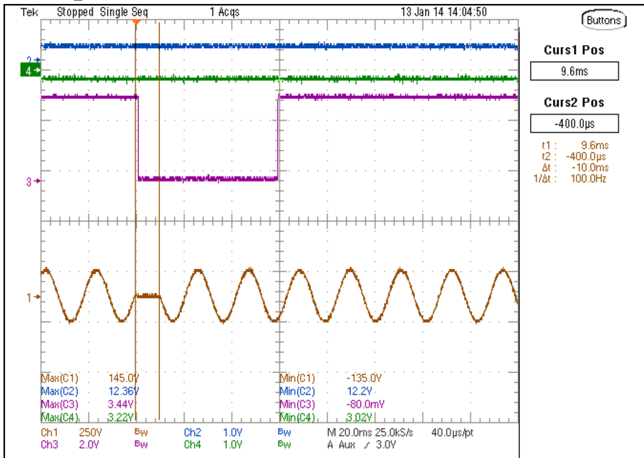
Test conditions:

Sample NO.1

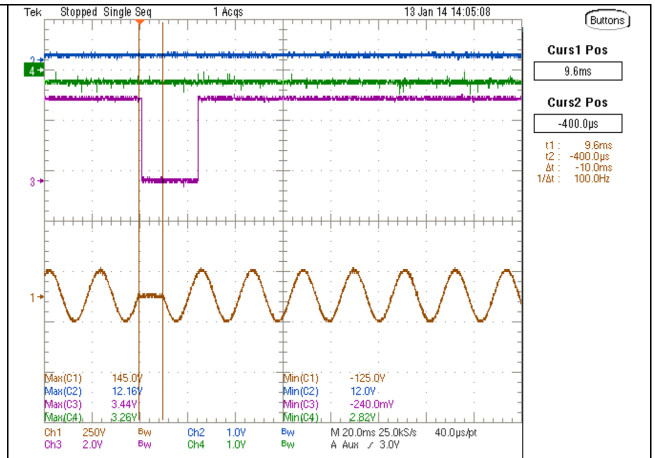
AMB. 25℃

Test 1	90V/47Hz	+12V/0.5A, +12Vsb/0.05A
Test 2	90V/47Hz	+12V/41A, +12Vsb/1A
Test 3	90V/47Hz	+12V/82A, +12Vsb/2A

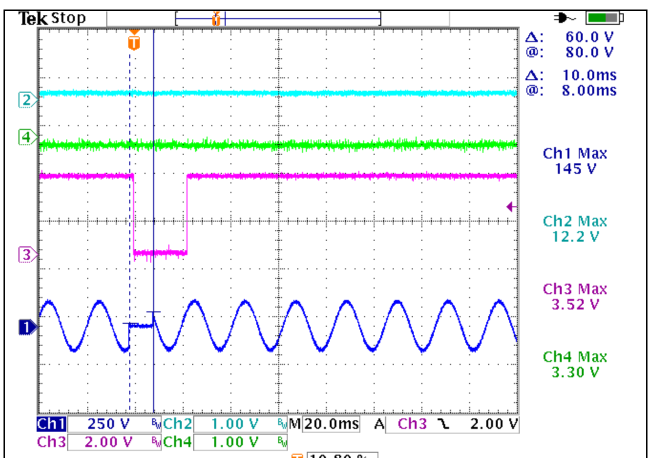
Graphical Result: PASS



Test condition: Test 1
CH1: AC I/P = 90V→0V(10ms)→90V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)



Test condition: Test 2
CH1: AC I/P = 90V→0V(10ms)→90V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)



Test condition: Test 3
CH1: AC I/P = 90V→0V(10ms)→90V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)

3.1.8 AC Line Dropout

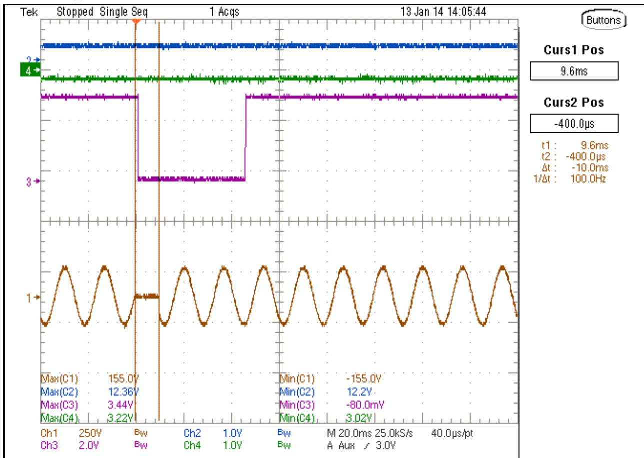
Test conditions:

Sample NO.1

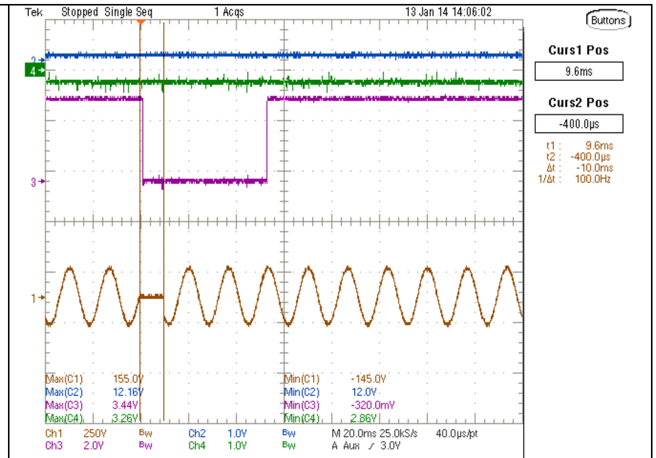
AMB. 25℃

Test 4	100V/60Hz	+12V/0.5A, +12Vsb/0.05A
Test 5	100V/60Hz	+12V/41A, +12Vsb/1A
Test 6	100V/60Hz	+12V/82A, +12Vsb/2A

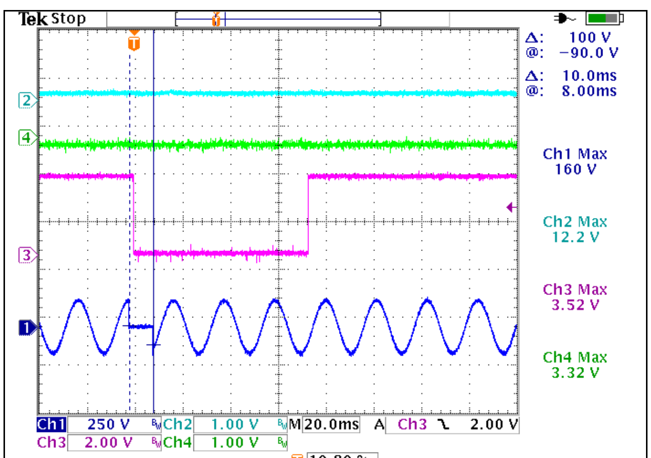
Graphical Result: PASS



Test condition: Test 4
CH1: AC I/P = 100V→0V(10ms)→100V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)



Test condition: Test 5
CH1: AC I/P = 100V→0V(10ms)→100V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)



Test condition: Test 6
CH1: AC I/P = 100V→0V(10ms)→100V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)

3.1.8 AC Line Dropout

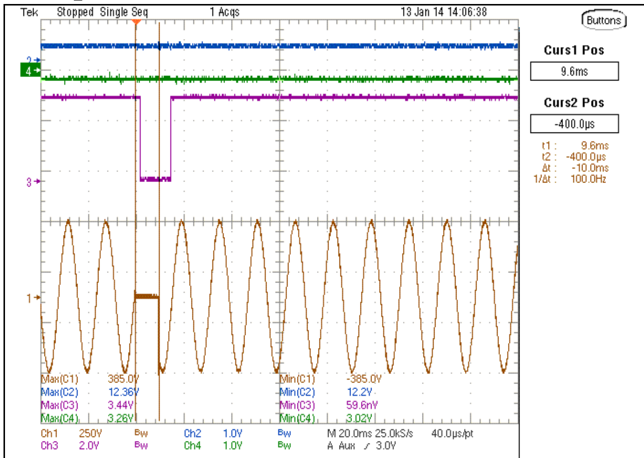
Test conditions:

Sample NO.1

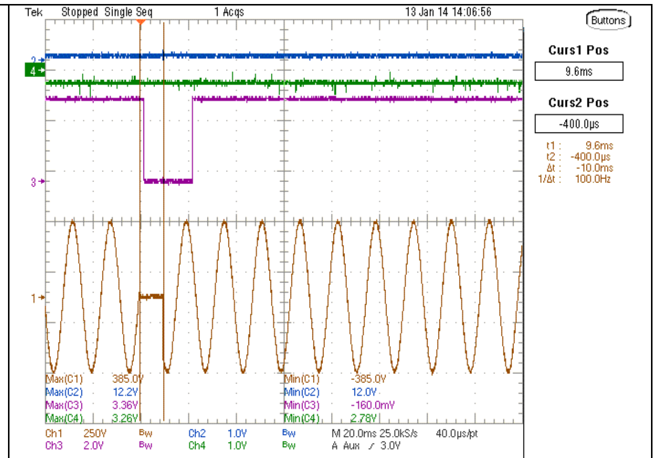
AMB. 25℃

Test 7	264V/63Hz	+12V/0.5A, +12Vsb/0.05A
Test 8	264V/63Hz	+12V/49A, +12Vsb/1A
Test 9	264V/63Hz	+12V/98A, +12Vsb/2A

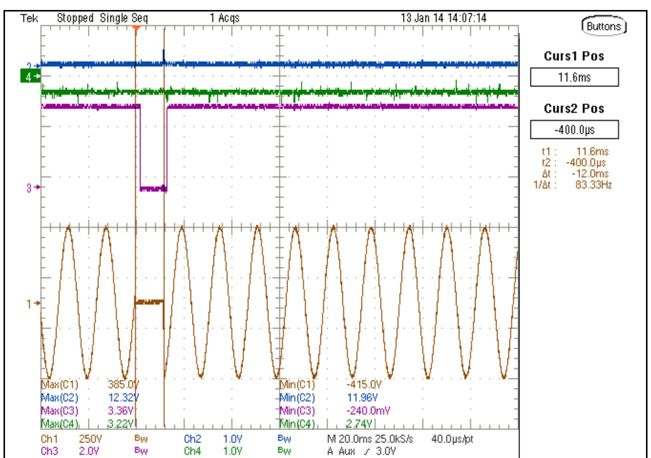
Graphical Result: PASS



Test condition: Test 7
CH1: AC I/P =264V→0V(10ms)→ 264V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)



Test condition: Test 8
CH1: AC I/P =264V→0V(10ms)→ 264V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)



Test condition: Test 9
CH1: AC I/P =264V→0V(10ms)→ 264V
CH2: +12V (Offset 12)
CH3: Alert
CH4: PWOK (Offset 3.3)

3.1.8 AC Line Dropout

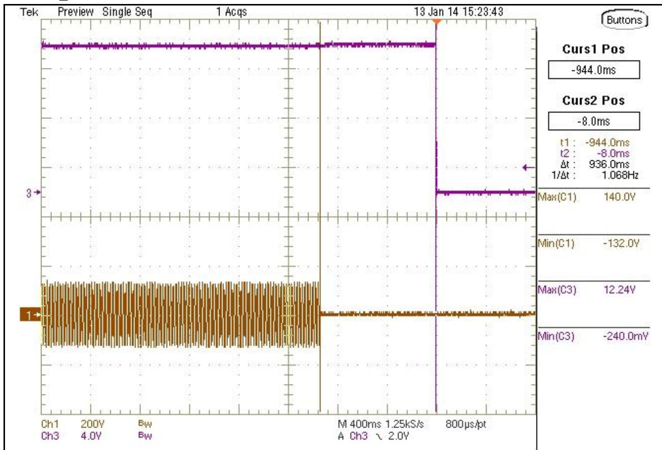
Test conditions:

Sample NO.1

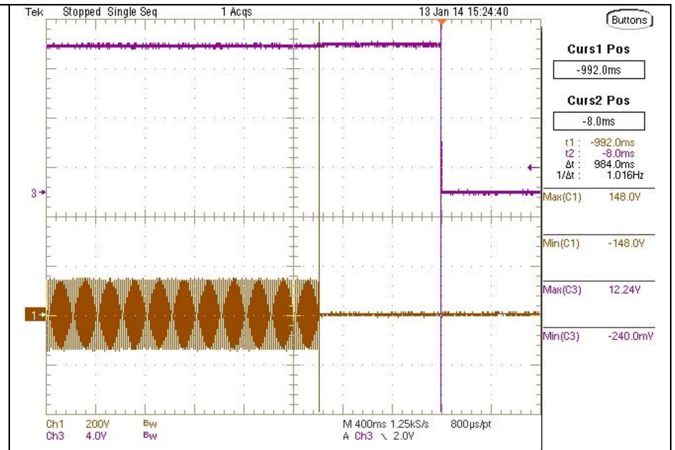
AMB. 25℃

Test 1	90V/47Hz	Main Power Off, +12Vsb/2A
Test 2	100V/60Hz	Main Power Off, +12Vsb/2A
Test 3	180V/47Hz	Main Power Off, +12Vsb/2A
Test 4	264V/63Hz	Main Power Off, +12Vsb/2A

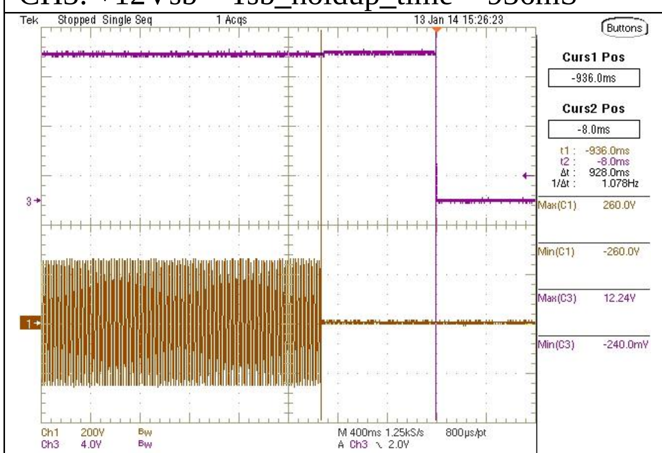
Graphical Result: PASS



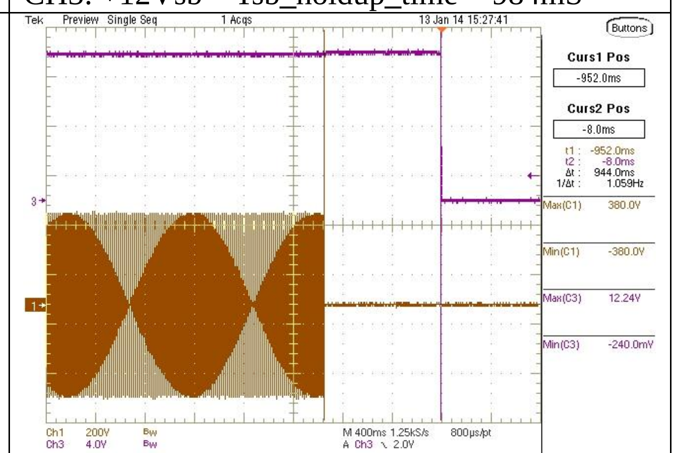
Test condition: Test 1
CH1: AC I/P
CH3: +12Vsb Tsb_holdup_time = 936mS



Test condition: Test 2
CH1: AC I/P
CH3: +12Vsb Tsb_holdup_time = 984mS



Test condition: Test 3
CH1: AC I/P
CH3: +12Vsb Tsb_holdup_time = 928mS



Test condition: Test 4
CH1: AC I/P
CH3: +12Vsb Tsb_holdup_time = 944mS

3.1.8 AC Line Dropout

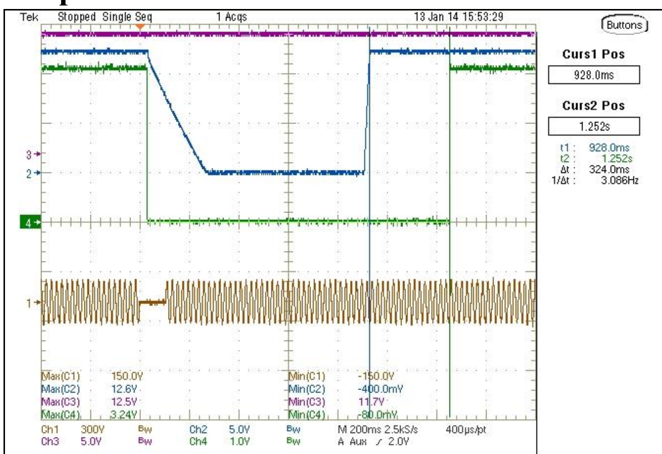
Test conditions:

Sample NO.1

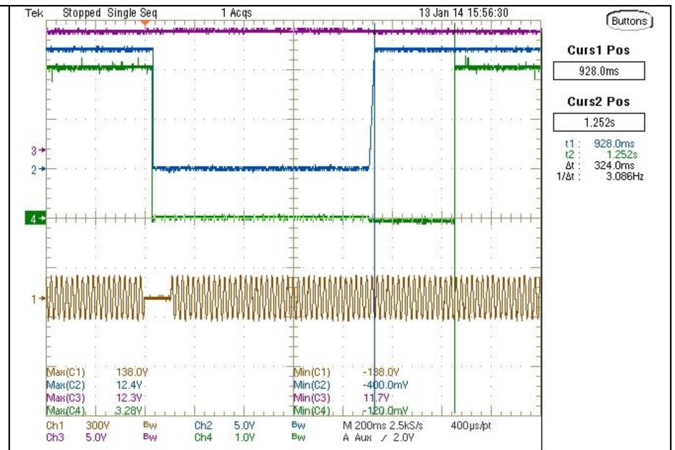
AMB. 25℃

Test 1	90V/47Hz	+12V/0.5A, +12Vsb/0.05A
Test 2	90V/47Hz	+12V/41A, +12Vsb/1A
Test 3	90V/47Hz	+12V/82A, +12Vsb/2A

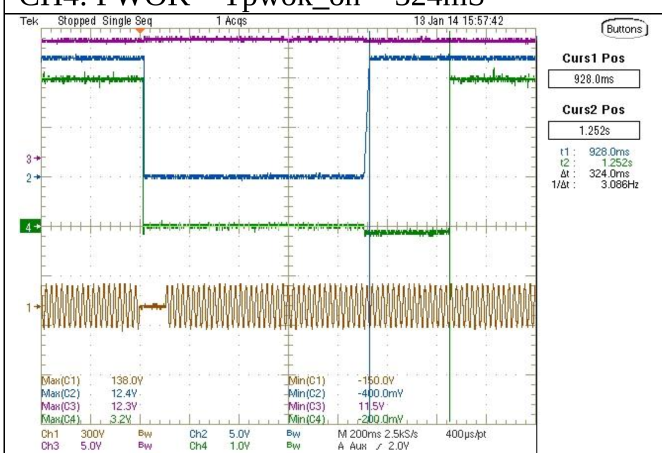
Graphical Result: PASS



Test condition: Test 1
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 324mS



Test condition: Test 2
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 324mS



Test condition: Test 3
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 324mS

3.1.8 AC Line Dropout

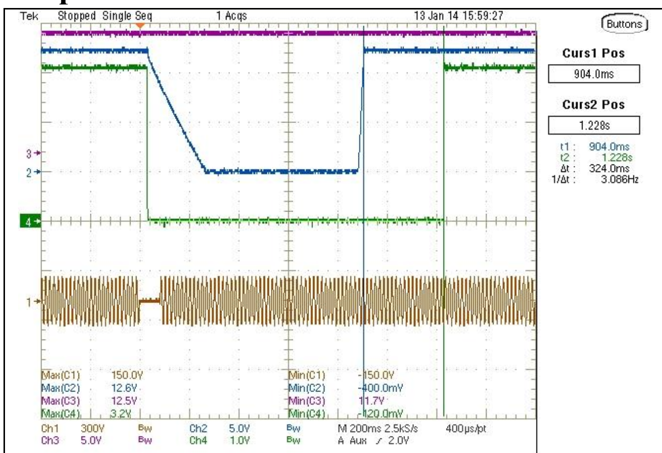
Test conditions:

Sample NO.1

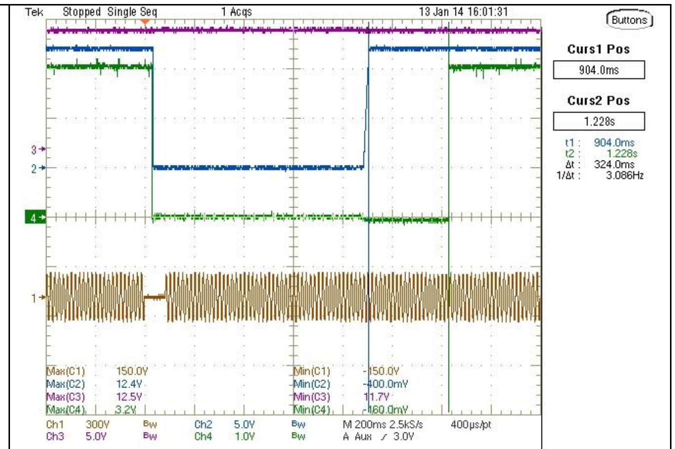
AMB. 25℃

Test 4	100V/60Hz	+12V/0.5A, +12Vsb/0.05A
Test 5	100V/60Hz	+12V/41A, +12Vsb/1A
Test 6	100V/60Hz	+12V/82A, +12Vsb/2A

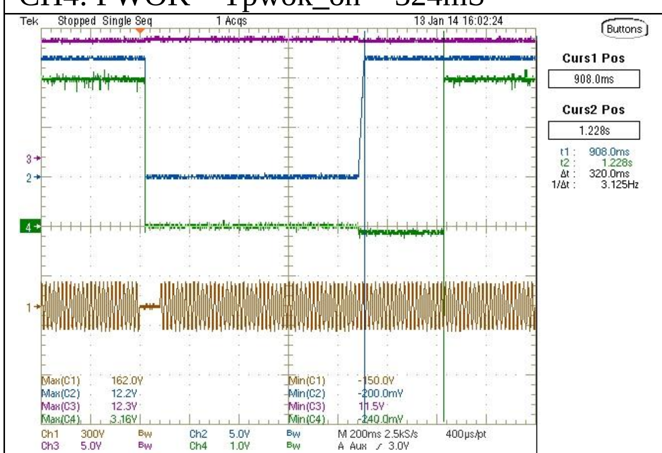
Graphical Result: PASS



Test condition: Test 4
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 324mS



Test condition: Test 5
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 324mS



Test condition: Test 6
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 320mS

3.1.8 AC Line Dropout

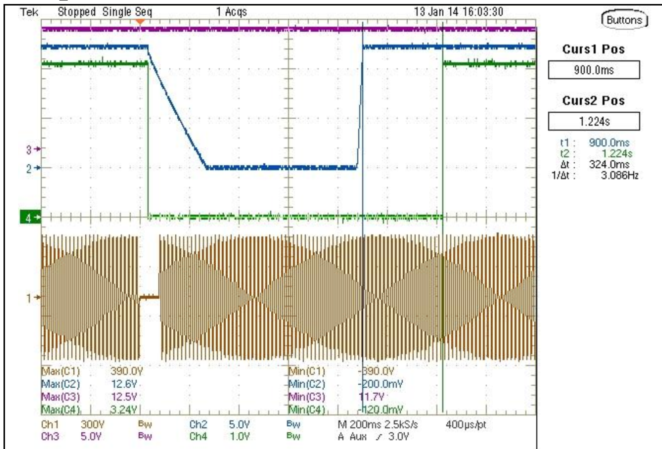
Test conditions:

Sample NO.1

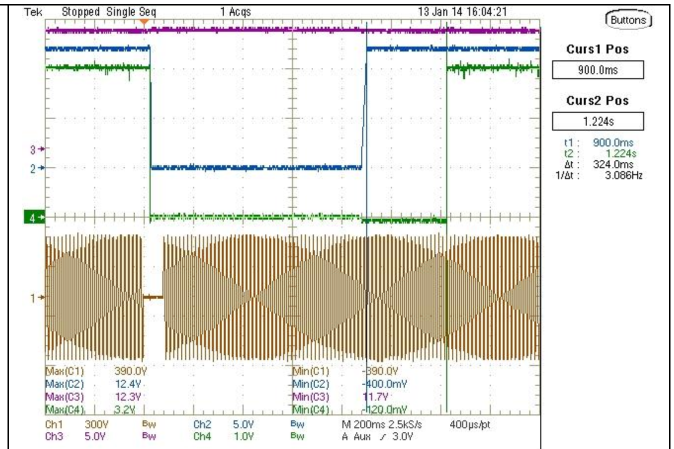
AMB. 25℃

Test 7	264V/63Hz	+12V/0.5A, +12Vsb/0.05A
Test 8	264V/63Hz	+12V/49A, +12Vsb/1A
Test 9	264V/63Hz	+12V/98A, +12Vsb/2A

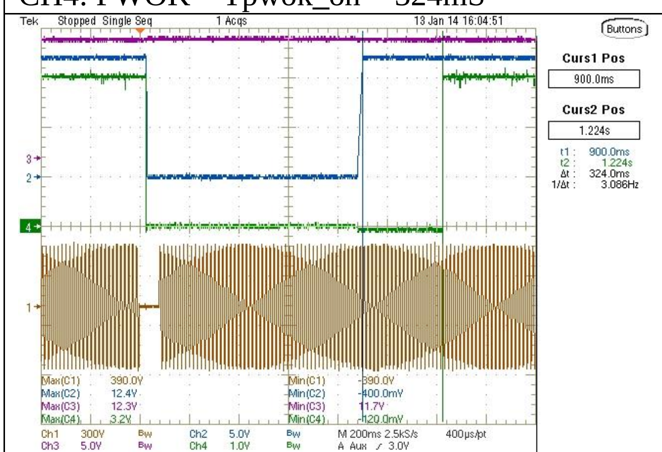
Graphical Result: PASS



Test condition: Test 7
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 324mS



Test condition: Test 8
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 324mS



Test condition: Test 9
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK Tpwok_on = 320mS

3.1.8 AC Line Dropout

Test conditions:

Sample NO.1

AMB. 25℃

Test 1	90V/47Hz	+12V/0.5A, +12Vsb/0.05A
Test 2	90V/47Hz	+12V/41A, +12Vsb/1A
Test 3	90V/47Hz	+12V/82A, +12Vsb/2A
Test 4	100V/60Hz	+12V/0.5A, +12Vsb/0.05A
Test 5	100V/60Hz	+12V/41A, +12Vsb/1A
Test 6	100V/60Hz	+12V/82A, +12Vsb/2A

Numerical Result: PASS

INPUT	LOAD	Phase	1 cycle	25ms	30ms	40ms	50ms	75ms	100ms	200ms
90V 47Hz	TEST 1	0°	A	A	A	B	B	B	B	B
		45°	A	A	A	B	B	B	B	B
		90°	A	A	A	B	B	B	B	B
		135°	A	A	A	B	B	B	B	B
	TEST 2	0°	A	A	B	B	B	B	B	B
		45°	A	B	B	B	B	B	B	B
		90°	A	A	B	B	B	B	B	B
		135°	A	A	B	B	B	B	B	B
	TEST 3	0°	B	B	B	B	B	B	B	B
		45°	B	B	B	B	B	B	B	B
		90°	B	B	B	B	B	B	B	B
		135°	B	B	B	B	B	B	B	B
100V 60Hz	TEST 4	0°	A	A	A	B	B	B	B	B
		45°	A	A	A	B	B	B	B	B
		90°	A	A	A	B	B	B	B	B
		135°	A	A	A	B	B	B	B	B
	TEST 5	0°	A	A	B	B	B	B	B	B
		45°	A	A	B	B	B	B	B	B
		90°	A	A	B	B	B	B	B	B
		135°	A	A	B	B	B	B	B	B
	TEST 6	0°	A	B	B	B	B	B	B	B
		45°	A	B	B	B	B	B	B	B
		90°	A	B	B	B	B	B	B	B
		135°	A	B	B	B	B	B	B	B

※ ATS TEST

3.1.8 AC Line Dropout

Test conditions:

Sample NO.1

AMB. 25℃

Test 7	264V/63Hz	+12V/0.5A, +12Vsb/0.05A
Test 8	264V/63Hz	+12V/49A, +12Vsb/1A
Test 9	264V/63Hz	+12V/98A, +12Vsb/2A

Numerical Result: PASS

INPUT	LOAD	Phase	1 cycle	25ms	30ms	40ms	50ms	75ms	100ms	200ms
264V 63Hz	TEST 7	0°	A	A	A	B	B	B	B	B
		45°	A	A	A	B	B	B	B	B
		90°	A	A	A	B	B	B	B	B
		135°	A	A	A	B	B	B	B	B
	TEST 8	0°	A	B	B	B	B	B	B	B
		45°	A	B	B	B	B	B	B	B
		90°	A	A	B	B	B	B	B	B
		135°	A	A	B	B	B	B	B	B
	TEST 9	0°	B	B	B	B	B	B	B	B
		45°	B	B	B	B	B	B	B	B
		90°	A	B	B	B	B	B	B	B
		135°	B	B	B	B	B	B	B	B

Note		
Criteria	**A**	Denotes normal operation, no hardware failures
	B	Some degradation allowed, self-recoverable, no hardware failures
	C	Temporary performance degradation, recovery by operator acceptable, no hardware failures, no ignition or smoke.
	D	Hardware failures, no ignition or smoke.

※ ATS TEST

3.1.9 AC Line Surge

AC line transient conditions shall be defined as “sag” and “surge” conditions. “Sag” conditions are also commonly referred to as “brownout”, these conditions will be defined as the AC line voltage dropping below nominal voltage conditions. “Surge” will be defined to refer to conditions when the AC line voltage rises above nominal voltage.

The power supply shall meet the requirements under the following AC line sag and surge conditions.

Table 4: AC Line Sag Transient Performance

AC Line Sag (10sec interval between each sagging)				
Duration	Sag	Operating AC Voltage	Line Frequency	Performance Criteria
0 to 1/2 AC cycle	95%	Nominal AC Voltage ranges	50/60Hz	No loss of function or performance
> 1 AC cycle	>30%	Nominal AC Voltage ranges	50/60Hz	Loss of function acceptable, self recoverable

Table 5: AC Line Surge Transient Performance

AC Line Surge				
Duration	Surge	Operating AC Voltage	Line Frequency	Performance Criteria
Continuous	10%	Nominal AC Voltages	50/60Hz	No loss of function or performance
0 to ½ AC cycle	30%	Mid-point of nominal AC Voltages	50/60Hz	No loss of function or performance

3.1.9 AC Line Surge

Test conditions:

1. 90VAC → 0V → 90VAC/ max load / 5S dropout
2. 264VAC → 0V → 264VAC/ max load / 5S dropout
3. 115VAC → 97.75VAC / max load /15 Sec
4. 115VAC → 132.25VAC / min load /15 Sec
5. 115VAC → 80.5VAC / max load /0.5 cycle
6. 115VAC → 149.5VAC / min load /0.5 cycle
7. 115VAC → 57.5VAC / max load /150mS
8. 115VAC → 57.5VAC / min load /250mS
9. 220VAC → 253VAC / max load /100mS
10. 220VAC → 286VAC / max load /0.5 cycle
11. 220VAC → 253VAC / min load /100mS
12. 220VAC → 286VAC / min load /0.5 cycle

Numerical Result: PASS

Test Item	Operating AC Voltage	Performance Criteria	Test Result
Test 1	90VAC → 0V → 90VAC/ max load / 5S dropout	Loss of function acceptable, self recoverable	PASS
Test 2	264VAC → 0V→ 264VAC/ max load / 5S dropout	Loss of function acceptable, self recoverable	PASS
Test 3	115VAC → 97.75VAC / max load /15 sec	no loss function	PASS
Test 4	115VAC → 132.25VAC / min load /15 sec	no loss function	PASS
Test 5	115VAC → 80.5VAC / max load /0.5 cycle	no loss function	PASS
Test 6	115VAC → 149.5VAC / min load /0.5 cycle	no loss function	PASS
Test 7	115VAC → 57.5VAC / max load /150mS	Loss of function acceptable, self recoverable	PASS
Test 8	115VAC → 57.5VAC / min load /250mS	Loss of function acceptable, self recoverable	PASS
Test 9	220VAC → 253VAC / max load /100mS	no loss function	PASS
Test 10	220VAC → 286VAC / max load /0.5 cycle	no loss function	PASS
Test 11	220VAC → 253VAC / min load /100mS	no loss function	PASS
Test 12	220VAC → 286VAC / min load /0.5 cycle	no loss function	PASS

※ **ATS TEST**

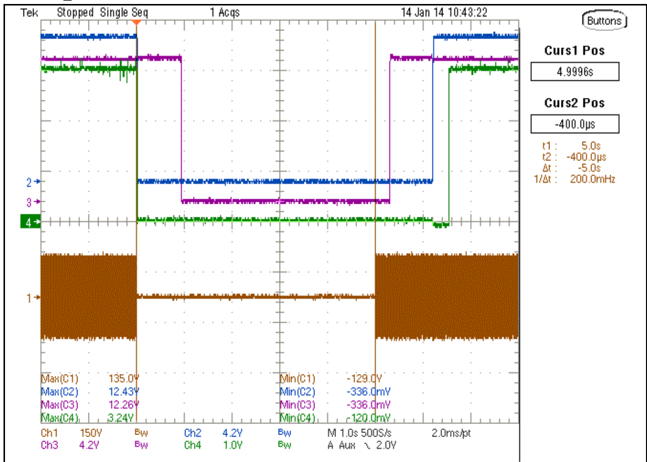
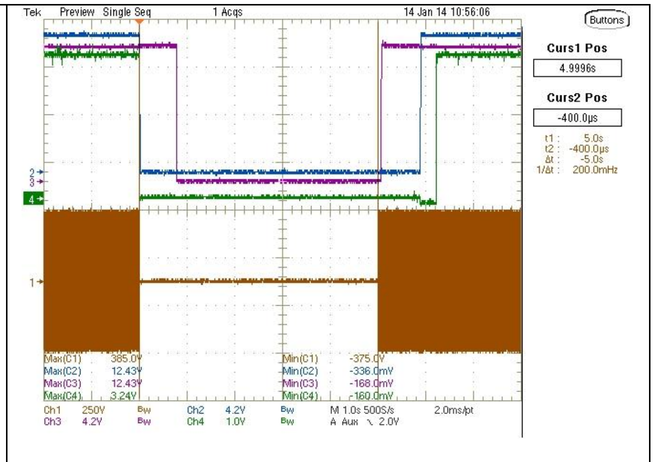
3.1.9 AC Line Surge

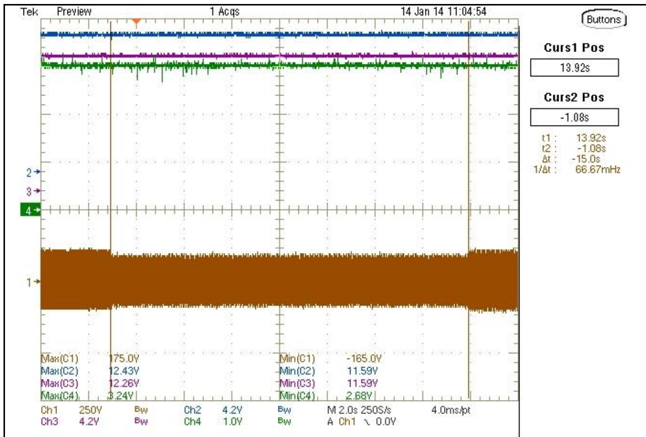
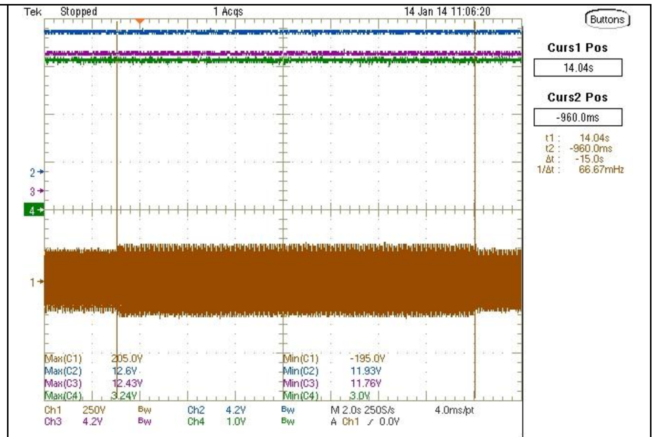
Test conditions:

Sample NO. 1

AMB. 25℃

Graphical Result: PASS

	
Test condition: Test 1 CH1: AC I/P=90VAC→0V→90VAC/max load/ 5S CH2: +12V CH3: +12Vsb CH4: PWOK	Test condition: Test 2 CH1: AC I/P=264VAC→0V→264VAC/max load/5S CH2: +12V CH3: +12Vsb CH4: PWOK

	
Test condition: Test 3 CH1: AC I/P=115VAC→97.75VAC/max load /15 sec CH2: +12V CH3: +12Vsb CH4: PWOK	Test condition: Test 4 CH1: AC I/P=115VAC→132.25VAC/min load /15 sec CH2: +12V CH3: +12Vsb CH4: PWOK

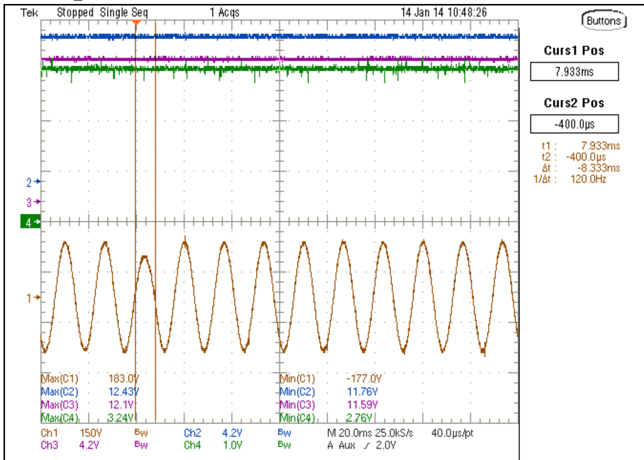
3.1.9 AC Line Surge

Test conditions:

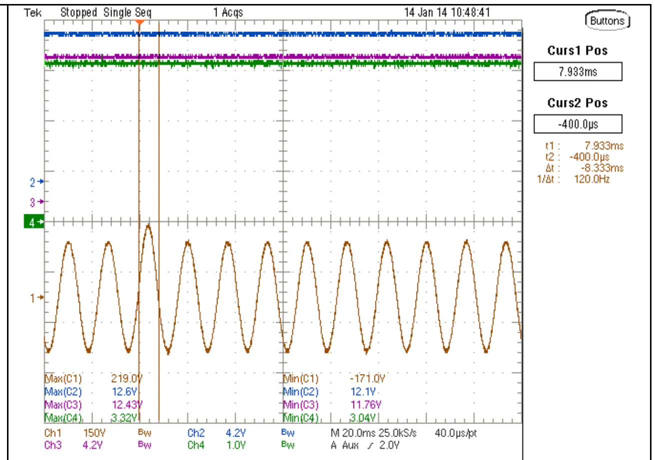
Sample NO. 1

AMB. 25℃

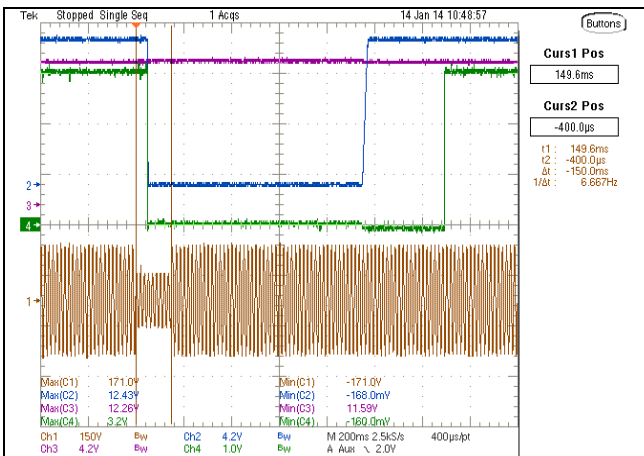
Graphical Result: PASS



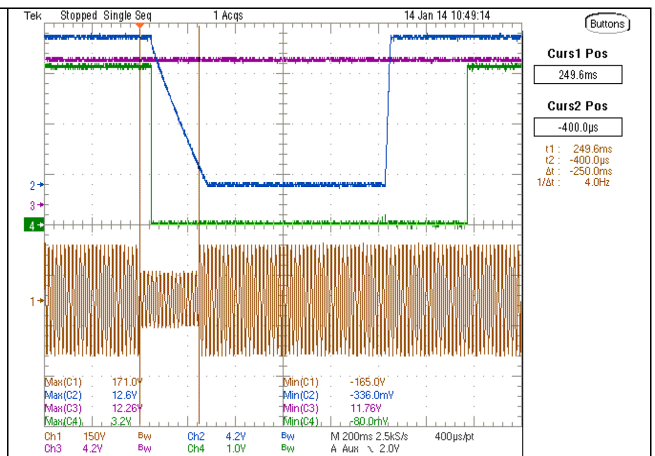
Test condition: Test 5
CH1: AC I/P=115VAC→80.5VAC/max load /0.5 cycle
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Test condition: Test 6
CH1: AC I/P=115VAC→149.5VAC/min load/0.5 cycle
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Test condition: Test 7
CH1:AC I/P=115VAC→57.5VAC/max load/150mS
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Test condition: Test 8
CH1:AC I/P=115VAC→57.5VAC/min load /250mS
CH2: +12V
CH3: +12Vsb
CH4: PWOK

3.1.9 AC Line Surge

Test conditions:

Sample NO. 1

AMB. 25℃

Graphical Result: PASS

<table>
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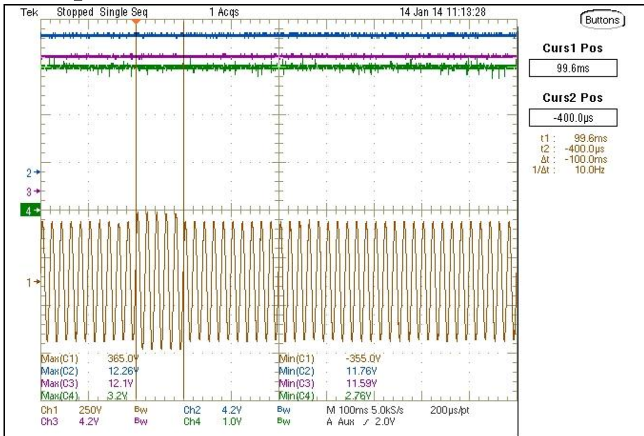
<td>
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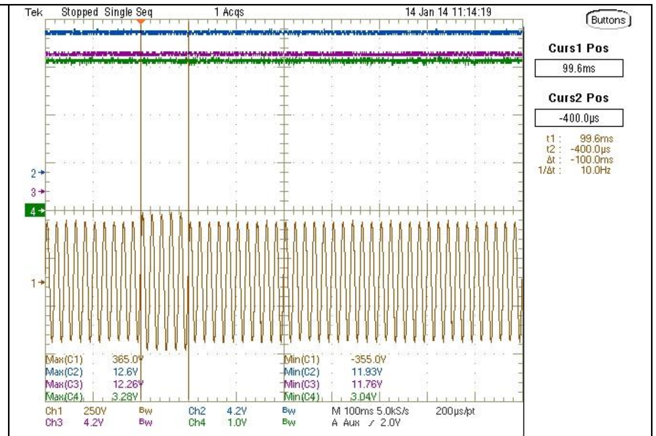
<td>
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</tr>
<tr>
<td>Test condition: Test 9
CH1: AC I/P=220VAC→253VAC/max load /100mS
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
<td>Test condition: Test 10
CH1: AC I/P=220VAC→286VAC/max load /0.5 cycle
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
</tr>
</table>

<table>
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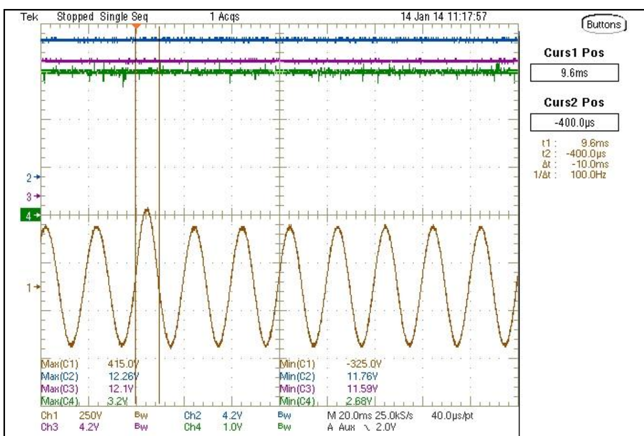
<td>
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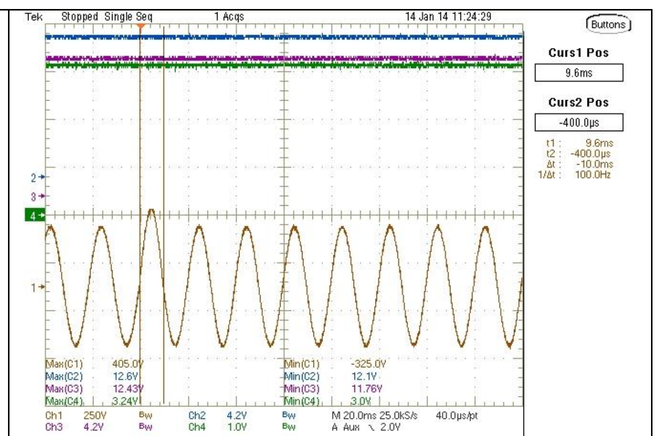
<td>
</td>
</tr>
<tr>
<td>Test condition: Test 11
CH1: AC I/P=220VAC→253VAC/min load/100mS
CH2: +12V (Offset 12V)
CH3: +12Vsb (Offset 12V)
CH4: PWOK (Offset 3.3V)</td>
<td>Test condition: Test 12
CH1: AC I/P=220VAC→286VAC/min load /0.5 cycle
CH2: +12V (Offset 12V)
CH3: +12Vsb (Offset 12V)
CH4: PWOK (Offset 3.3V)</td>
</tr>
</table>

3.1.10 AC Turn On

The power supply tries only to start, if the AC input voltage is within a range, that the supply is able to start-up under full load condition. After restoring a mains failure, the PSU starts up automatically.

Test conditions:

Sample NO. 1

AMB. 25℃

Lowest Nominal = 100Vac LOAD: +12V/82A, +12Vsb/2A

Highest Nominal = 240Vac LOAD: +12V/98A, +12Vsb/2A

Test Result: PASS

		25ms	40ms	60ms	90ms	0.13S	0.2S	0.28S	0.4S	0.6S	0.9S	1.3S	2S
Lowest Nominal	-40%	A	B	B	B	B	B	B	B	B	B	B	B
	-50%	A	B	B	B	B	B	B	B	B	B	B	B
	-60%	A	B	B	B	B	B	B	B	B	B	B	B
	-70%	B	B	B	B	B	B	B	B	B	B	B	B
	-80%	B	B	B	B	B	B	B	B	B	B	B	B
	-90%	B	B	B	B	B	B	B	B	B	B	B	B
	-100%	B	B	B	B	B	B	B	B	B	B	B	B
Highest Nominal	-40%	A	A	A	C	C	C	C	C	C	C	C	C
	-50%	A	A	A	A	C	C	C	C	C	C	C	C
	-60%	A	A	A	A	C	C	C	C	C	C	C	C
	-70%	A	A	B	B	B	B	B	B	B	B	B	B
	-80%	B	B	B	B	B	B	B	B	B	B	B	B
	-90%	B	B	B	B	B	B	B	B	B	B	B	B
	-100%	B	B	B	B	B	B	B	B	B	B	B	B

Note		
Criteria	**A**	Denotes normal operation, no hardware failures
	B	Some degradation allowed, self-recoverable, no hardware failures
	C	Temporary performance degradation, recovery by operator acceptable, no hardware failures, no ignition or smoke.
	D	Hardware failures, no ignition or smoke.

3.1.10 AC Turn On

The power supply tries only to start, if the AC input voltage is within a range, that the supply is able to start-up under full load condition. After restoring a mains failure, the p/s starts up automatically.

Test conditions:

Sample NO. 1

AMB. 25℃

Lowest Nominal = 100Vac

Highest Nominal = 240Vac

LOAD: +12V/0.5A, +12Vsb/0.05A

Test Result: PASS

		25ms	40ms	60ms	90ms	0.13S	0.2S	0.28S	0.4S	0.6S	0.9S	1.3S	2S
Lowest Nominal	-40%	A	A	B	B	B	B	B	B	B	B	B	B
	-50%	A	A	B	B	B	B	B	B	B	B	B	B
	-60%	A	B	B	B	B	B	B	B	B	B	B	B
	-70%	A	A	B	B	B	B	B	B	B	B	B	B
	-80%	A	B	B	B	B	B	B	B	B	B	B	B
	-90%	A	B	B	B	B	B	B	B	B	B	B	B
	-100%	A	B	B	B	B	B	B	B	B	B	B	B
Highest Nominal	-40%	A	A	A	A	A	A	A	A	A	A	A	A
	-50%	A	A	A	A	A	A	A	A	A	A	A	A
	-60%	A	A	A	A	A	A	A	A	A	A	A	A
	-70%	A	A	A	A	A	A	B	B	B	B	B	B
	-80%	A	A	B	B	B	B	B	B	B	B	B	B
	-90%	A	B	B	B	B	B	B	B	B	B	B	B
	-100%	A	B	B	B	B	B	B	B	B	B	B	B

Note		
Criteria	**A**	Denotes normal operation, no hardware failures
	B	Some degradation allowed, self-recoverable, no hardware failures
	C	Temporary performance degradation, recovery by operator acceptable, no hardware failures, no ignition or smoke.
	D	Hardware failures, no ignition or smoke.

3.1.10 AC Turn On

Test conditions:

Sample NO.1

AMB. 25℃

INPUT: 180Vac/60Hz

Output Load: +12V/82A, +12Vsb/0A

STEP1: AC I/P = 90VAC/60Hz, +12VSB@ 0.2A, +12V@**82.00A**

STEP2: The LED should be green. The SMBAlert is High.

STEP3: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_IOUT	7Bh	00h
3	STATUS_INPUT	7Ch	00h

STEP4: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_IOUT, STATUS_INPUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_IOUT	7Bh	00h
3	STATUS_INPUT	7Ch	00h

STEP13: AC I/P = 180VAC/60Hz, +12VSB@ 0.2A, +12V@**98.0A**

STEP14: The LED should be green. The SMBAlert is High.

STEP15: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_VOUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_VOUT	7Ah	00h

STEP16: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_VOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_VOUT	7Ah	00h

STEP16: Change input voltage to AC I/P = 90VAC/60Hz, +12VSB@ 0.2A, +12V@ **82.00A**

STEP17: The LED should be green.

STEP18: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT, STATUS_INPUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_IOUT	7Bh	00h
3	STATUS_INPUT	7Ch	00h

3.1.10 AC Turn On

Test conditions:

Sample NO.1

AMB. 25℃

INPUT: 180Vac/60Hz

Output Load: +12V/82A, +12Vsb/0A

STEP1: AC I/P = 90VAC/60Hz, +12VSB@ 0.2A, +12V@**82.00A**

STEP2: The LED should be green. The SMBAlert is High.

STEP3: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_IOUT	7Bh	00h
3	STATUS_INPUT	7Ch	00h

STEP4: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_IOUT, STATUS_INPUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_IOUT	7Bh	00h
3	STATUS_INPUT	7Ch	00h

STEP13: AC I/P = 180VAC/60Hz, +12VSB@ 0.2A, +12V@**98.0A**

STEP14: The LED should be green. The SMBAlert is High.

STEP15: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_VOUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_VOUT	7Ah	00h

STEP16: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_VOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_VOUT	7Ah	00h

STEP16: Change input voltage to AC I/P = 90VAC/60Hz, +12VSB@ 0.2A, +12V@ **82.00A**

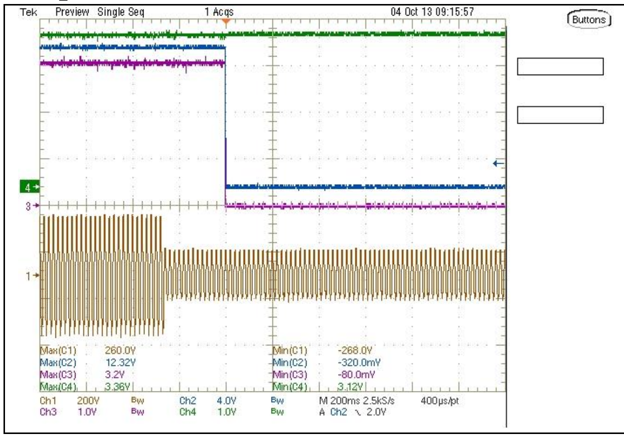
STEP17: The LED should be green.

STEP18: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT, STATUS_INPUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_IOUT	7Bh	00h
3	STATUS_INPUT	7Ch	00h

Test Result: PASS

Graphical Result: PASS

	Test condition: CH1: AC I/P CH2: +12V CH3: PWOK CH4: +SMBAler

3.1.11 AC Fast Transient Specification

The power supply meets the EN61000-4-5 directive with the following conditions and exceptions:

- These input transients do not cause any out-of-regulation conditions, such as overshoot and undershoot, nor does it cause any nuisance trips of any of the power supply protection circuits.
- The surge-withstand test does not produce damage to the power supply.
- The supply meets surge-withstand test conditions under maximum and minimum DC-output load conditions

3.1.12 AC Line Isolation Requirements (N/A)

The power supply shall meet all safety agency requirements for dielectric strength. Additionally, power supply vendor must provide customer with written confirmation of dielectric withstand test which includes: voltage level, duration of test and identification detailing how each power supply is marked to indicate dielectric withstand test had been completed successfully. Transformers' isolation between primary and secondary windings must comply with the 3000Vac (4242Vdc) dielectric strength criteria. If the working voltage between primary and secondary dictates a higher dielectric strength test voltage the highest test voltage should be used. In addition the insulation system must comply with reinforced insulation per safety standard IEC 950. Separation between the primary and secondary circuits, and primary to ground circuits, must comply with the IEC 950 spacing requirements.

3.1.13 BROWNIN and BROWNOUT

Power supply shall return to normal power up state after a slow brownout condition. The brownout condition shall be tested with all valid redundant power system configurations using the end use system/s. While the power system is operating at rated DC load, the AC line voltage shall be reduced from 100VAC/60Hz to 0VAC at a constant rate over a period of 30s. The power shall be then reapplied at 100VAC/60Hz.

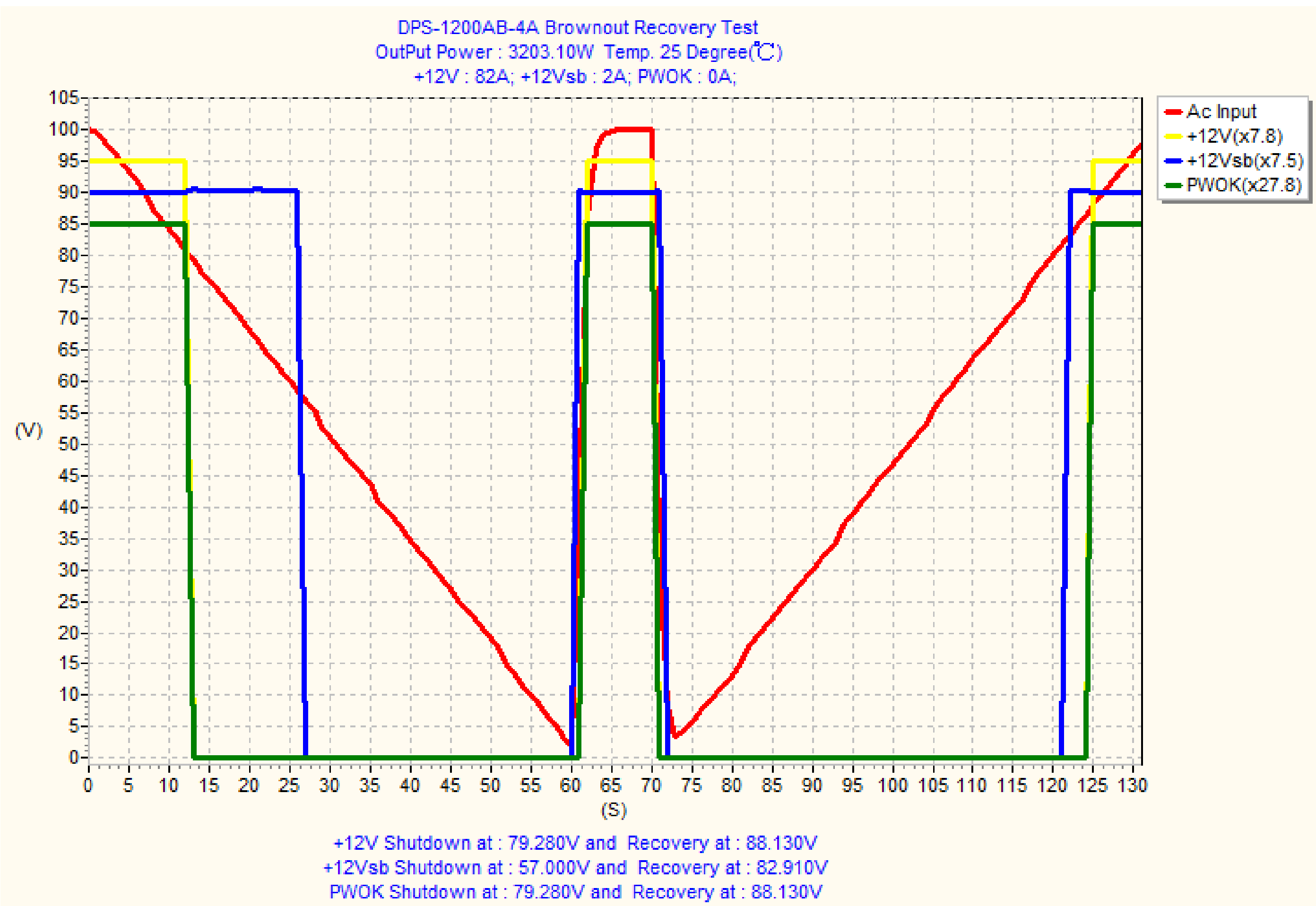
Test conditions:

Sample NO.1

INPUT: 90V → 0V → 90V (6min)

Load: +12V/82A, +12Vsb/2A

Graphical Result: PASS



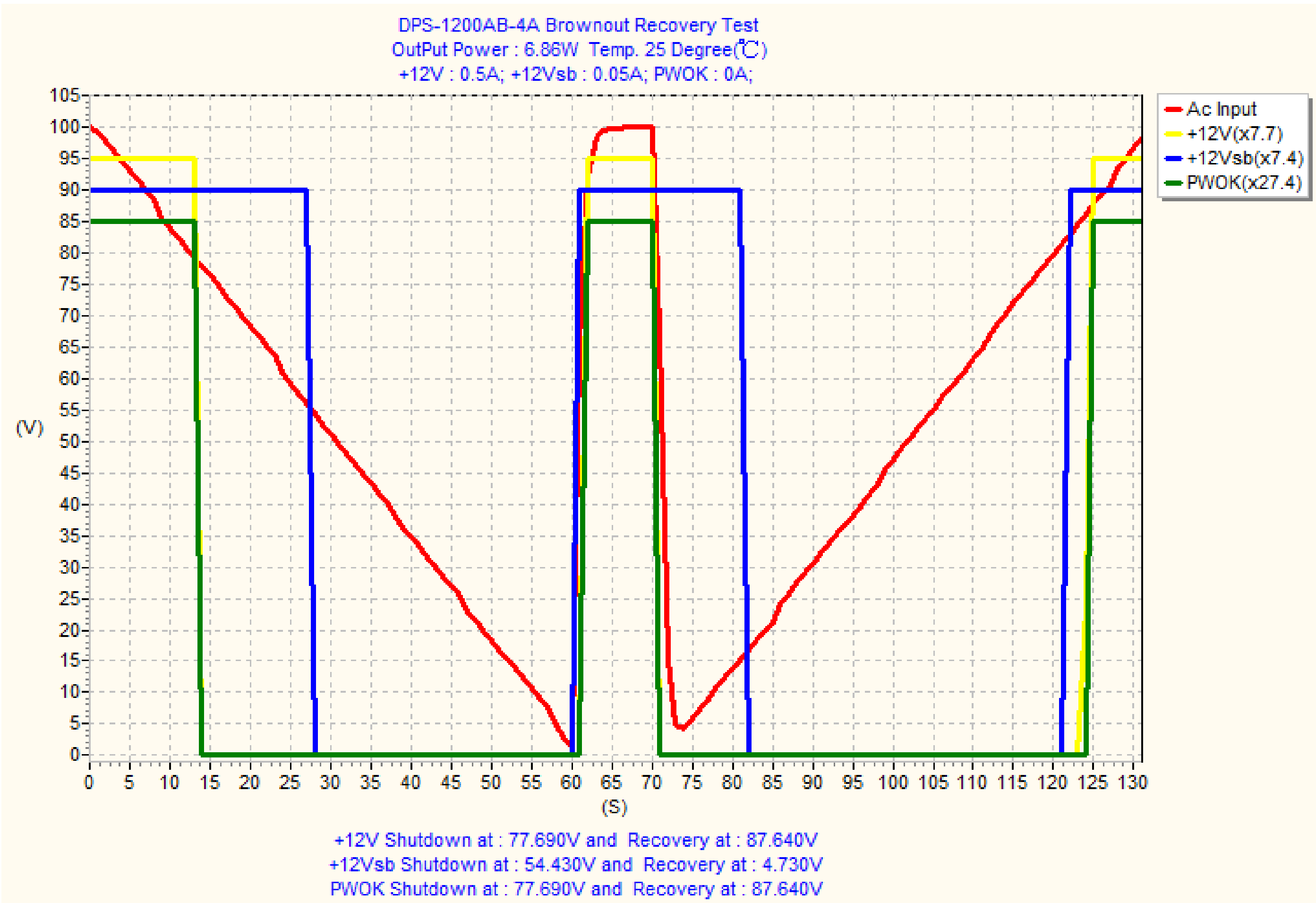
Test conditions:

Sample NO.1

INPUT: 90V → 0V → 90V (6min)

Load: +12V/0.5A, +12Vsb/0.05As

Graphical Result: PASS



3.2 DC Output Data

3.2.1 DC Output Connector

The output gold finger connector connects the power as well as the signal to the system or power backplane board. One pin (PSKILL) is shortened to allow for hot swapping of the power supply. .

Signal Description

Table 6: Signal description

Signal	Description
+12V	+ 12V output
+12VSB	+12V standby output
GND	0V ground
12VLS	+12V load share bus
12VS	+12V remote sense
RETURN_SENSE	0V remote sense
PRESENT_N	Power supply present
PWOK	Output Power ok
PSKILL	Supply fast shut down
~~ACFAIL~~	~~Line failure signal~~
PSON	Power enable / disable
SCL	SMBus Clock
SDA	SMBus Data
A0	SMBus address bit 0
A1	SMBus address bit 1
~~W_PROT~~	~~EEPROM Write Protection~~
SMBAlert	I2C alert signal
SMART_ON	Control signal for smart redundancy (power save)

3.2.2 +12V Standby Voltage

The +12VSB is available, if the PSU is connected to the mains. After applying the line voltage to the power supply, the standby voltage is the first voltages, which is in its nominal ranges and after a mains failure this voltage is the last, which leaves its nominal range. The standby output is permanent short-circuit, overload and over voltage protected. The +12VSB holdup time is >70ms after AC loss goes LOW over entire input voltage range and at full load.

3.2.3 Output Currents

The combined output power of all outputs shall not exceed 1000W max@ 90V AC to 127 AC input. The combined output power of all outputs shall not exceed 1200W max @ 180V to 264VAC input.
Each output has a maximum and minimum current rating shown in the table below.

. Table 7: output currents

Output	+12V	+12VSB
Nominal@100V-127V	82A	2.0A
Nominal@200V-240V	98A	2.0A
Min Static	0.5A	0.05A

3.2.4 Voltage Regulation

.3.2.4.1 Static Regulation

The power supply voltage must stay within the following voltage limits when operating at steady state load conditions. These limits do not include the peak-peak ripple/noise specified in section 3.2.8. All outputs are measured with reference to the +12VS and RETURN_SENSE signal. The +12VSB is measured at the output connector.

Table 8: Static regulation

	Min	Nom	Max	Tolerance
+12V	11.64V	12.0V	12.36V	+3% / -3%
+12VSB	11.64V	12.0V	12.36V	+3% / -3%

Test Condition:

Sample NO.1

Vin : 90Vac/47Hz, 264Vac/63Hz

O/P Load : Max, Min Load

AMB : 0oC, 25℃, 50oC

Numerical Result: PASS

AMB	AC Condition	O/P Load (A)		Voltage Regulation Reading (V)	
		12V	12Vsb	12V	12Vsb
0°C	90Vac/47Hz	0.5	0.05	12.306	12.031
		0.5	2	12.306	11.925
		82	0.05	12.181	12.018
		82	2	12.181	11.906
		41	1	12.187	11.956
	264Vac/63Hz	0.5	0.05	12.306	12.037
		0.5	2	12.306	11.931
		98	0.05	12.181	12.018
		98	2	12.181	11.906
		41	1	12.175	11.956
SPEC			Max	12.36	12.36
			Min	11.64	11.64

※ **ATS TEST**

AMB	AC Condition	O/P Load (A)		Voltage Regulation Reading (V)	
		12V	12Vsb	12V	12Vsb
25°C	90Vac/47Hz	0.5	0.05	12.312	12.093
		0.5	2	12.312	11.975
		82	0.05	12.175	12.075
		82	2	12.175	11.956
		41	1	12.181	12.006
	264Vac/63Hz	0.5	0.05	12.306	12.100
		0.5	2	12.312	11.975
		98	0.05	12.175	12.075
		98	2	12.175	11.950
		41	1	12.175	12.006
SPEC			Max	12.36	12.36
			Min	11.64	11.64

※ **ATS TEST**

AMB	AC Condition	O/P Load (A)		Voltage Regulation Reading (V)	
		12V	12Vsb	12V	12Vsb
50°C	90Vac/47Hz	0.5	0.05	12.312	12.143
		0.5	2	12.312	12.006
		82	0.05	12.168	12.125
		82	2	12.168	11.981
		41	1	12.175	12.043
	264Vac/63Hz	0.5	0.05	12.312	12.143
		0.5	2	12.312	12.006
		98	0.05	12.168	12.112
		98	2	12.168	11.975
		41	1	12.175	12.043
SPEC			Max	12.36	12.36
			Min	11.64	11.64

※ **ATS TEST**

3.2.4.2 Dynamic Regulation

The output voltages remains within the limits specified in the first table for the step loading, turn ON/OFF and capacitive loading specified in the second table. The dynamic tolerance includes the static regulation tolerance. The load transient repetition rate is tested between 10Hz and 10 KHz. 12V dynamic minimum loading is 1A.

Table 9: Dynamic regulation

	Min	**Max**	**Tolerance**
+12V	11.4V	12.6V	+5% / -5%
+12VSB	11.4V	12.6V	+5% / -5%

	Step Load Size	**Slew Rate**	**Capacitive Load**
+12V	50% of max load	0.5A/µsec	1,000µF
+12VSB	50% of max load	0.5A/µsec	100µF

* When 12VSB current change from maximum loading to minimum loading and slew rate as the as above table define. The power supply can not shutdown but the output regulation can be loss.

3.2.4.2 Dynamic (+12V)

Test condition:
Sample NO.1
Vin : 90Vac/47Hz, 264Vac/63Hz
O/P Load : Max, Min Load
AMB : 0oC, 25℃, 50oC
Load slew rate = 0.5A /µSec
Frequency = 50Hz(10ms)

Numerical Result: PASS

AMB	AC Condition	Dwell time Level	12V Load	12Vsb Load	Test Reading (V)	
					Max	Min
0°C	90Vac/47Hz	10ms	1A ⇔ 42A	0.05A	12.400	12.031
			1A ⇔ 42A	2A	12.393	12.025
			82A ⇔ 41A	0.05A	12.300	12.037
			82A ⇔ 41A	2A	12.306	12.050
	264Vac/63Hz		1A ⇔ 50A	0.05A	12.412	12.018
			1A ⇔ 50A	2A	12.425	12.025
			98A ⇔ 49A	0.05A	12.312	12.025
			98A ⇔ 49A	2A	12.312	12.018
SPEC					11.4V ~ 12.6V	

※ **ATS TEST**

AMB	AC Condition	Dwell time Level	12V Load	12Vsb Load	Test Reading (V)	
					Max	Min
25°C	90Vac/47Hz	10ms	1A ⇔ 42A	0.05A	12.400	12.056
			1A ⇔ 42A	2A	12.406	12.056
			82A ⇔ 41A	0.05A	12.287	12.056
			82A ⇔ 41A	2A	12.300	12.062
	264Vac/63Hz		1A ⇔ 50A	0.05A	12.412	12.043
			1A ⇔ 50A	2A	12.406	12.025
			98A ⇔ 49A	0.05A	12.306	12.043
			98A ⇔ 49A	2A	12.300	12.043
SPEC					11.4V ~ 12.6V	

※ **ATS TEST**

AMB	AC Condition	Dwell time Level	12V Load	12Vsb Load	Test Reading (V)	
					Max	Min
50°C	90Vac/47Hz	10ms	1A ⇔ 42A	0.05A	12.406	12.062
			1A ⇔ 42A	2A	12.406	12.062
			82A ⇔ 41A	0.05A	12.293	12.056
			82A ⇔ 41A	2A	12.300	12.050
	264Vac/63Hz		1A ⇔ 50A	0.05A	12.412	12.050
			1A ⇔ 50A	2A	12.412	12.037
			98A ⇔ 49A	0.05A	12.293	12.031
			98A ⇔ 49A	2A	12.293	12.037
SPEC					11.4V ~ 12.6V	

※ **ATS TEST**

3.2.4.2 Dynamic (+12V)

Test conditions:

Sample NO.1

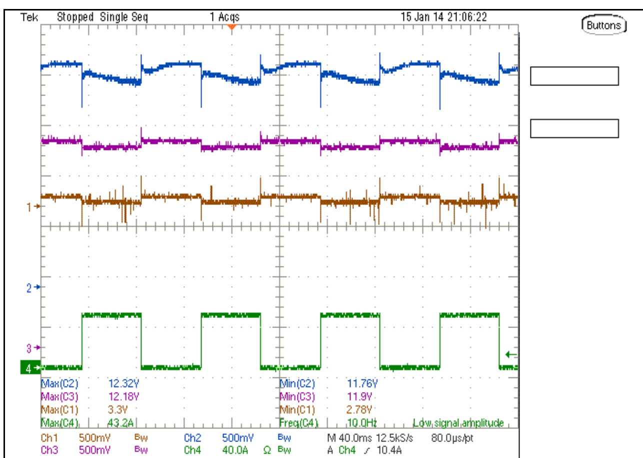
AMB. 25℃

Capacitive Load: +12V/1000uF; +12Vsb/100uF

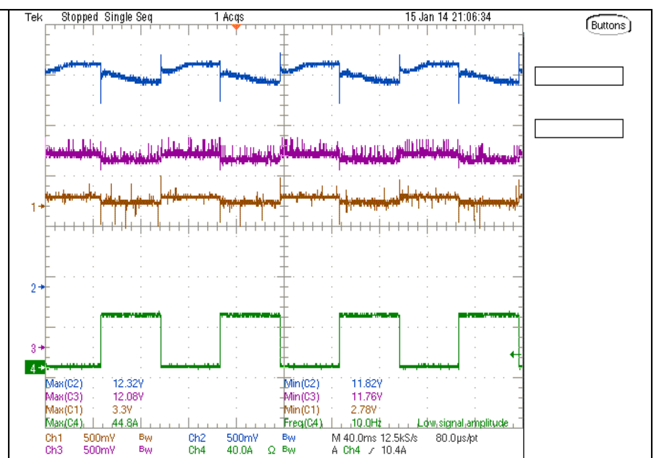
Graphical Result: PASS

	+12V		+12Vsb		PW_OK		
Test Condition	Max(V)	Min(V)	Max(V)	Min(V)	Max(V)	Min(V)	Result
+12V dynamic O/P: 1A to 42A 10Hz,+12Vsb/0.05A; I/P: 90Vac,O/P With 1000uF	12.240	11.760	12.180	11.900	3.300	2.780	PASS
+12V dynamic O/P: 1A to 42A 10Hz,+12Vsb/2A; I/P: 90Vac,O/P With 1000uF	12.320	11.820	12.080	11.760	3.300	2.780	PASS
+12V dynamic O/P: 41A to 82A 10Hz,+12Vsb/0.05A; I/P: 90Vac,O/P With 1000uF	12.260	11.740	12.120	11.820	3.260	2.720	PASS
+12V dynamic O/P: 41A to 82A 10Hz,+12Vsb/2A; I/P: 90Vac,O/P With 1000uF	12.200	11.840	12.020	11.740	3.220	2.740	PASS
+12V dynamic O/P: 1A to 42A 10KHz,+12Vsb/0.05A; I/P: 90Vac,O/P With 1000uF	12.200	11.760	12.180	11.860	3.460	2.660	PASS
+12V dynamic O/P: 1A to 42A 10KHz,+12Vsb/2A; I/P: 90Vac,O/P With 1000uF	12.360	11.760	12.160	11.740	3.460	2.640	PASS
+12V dynamic O/P: 41A to 82A 10KHz,+12Vsb/0.05A; I/P: 90Vac,O/P With 1000uF	12.300	11.740	12.160	11.840	3.400	2.580	PASS
+12V dynamic O/P: 41A to 82A 10KHz,+12Vsb/2A; I/P: 90Vac,O/P With 1000uF	12.300	11.760	12.100	11.680	3.320	2.600	PASS
+12V dynamic O/P: 1A to 42A 10Hz,+12Vsb/0.05A; I/P: 100Vac,O/P With 1000uF	12.280	11.880	12.120	11.920	3.240	2.800	PASS
+12V dynamic O/P: 1A to 42A 10Hz,+12Vsb/2A; I/P: 100Vac,O/P With 1000uF	12.280	11.860	12.080	11.740	3.240	2.800	PASS
+12V dynamic O/P: 41A to 82A 10Hz,+12Vsb/0.05A; I/P: 100Vac,O/P With 1000uF	12.140	11.880	12.060	11.880	3.200	2.720	PASS
+12V dynamic O/P: 41A to 82A 10Hz,+12Vsb/2A; I/P: 100Vac,O/P With 1000uF	12.140	11.880	12.020	11.740	3.240	2.720	PASS
+12V dynamic O/P: 1A to 42A 10KHz,+12Vsb/0.05A; I/P: 100Vac,O/P With 1000uF	12.120	11.760	12.180	11.880	3.420	2.640	PASS
+12V dynamic O/P: 1A to 42A 10KHz,+12Vsb/2A; I/P: 100Vac,O/P With 1000uF	12.340	11.760	12.160	11.740	3.460	2.680	PASS

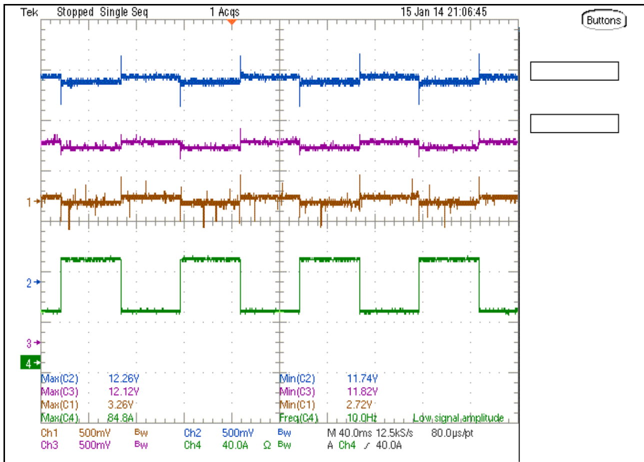
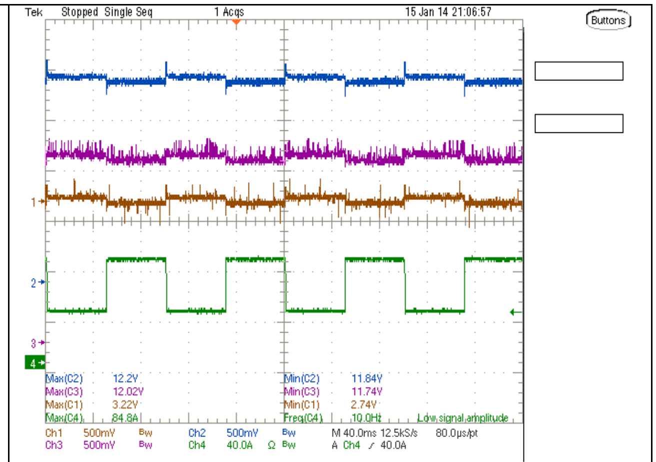
+12V dynamic O/P: 41A to 82A 10KHz,+12Vsb/0.05A; I/P: 100Vac,O/P With 1000uF	12.280	11.740	12.120	11.800	3.380	2.560	PASS
+12V dynamic O/P: 41A to 82A 10KHz,+12Vsb/2A; I/P: 100Vac,O/P With 1000uF	12.280	11.720	12.080	11.680	3.320	2.580	PASS
+12V dynamic O/P: 1 to 50A 10Hz,+12Vsb/0A; I/P: 264Vac,O/P With 1000uF	12.280	11.800	12.140	11.860	3.320	2.760	PASS
+12V dynamic O/P: 1 to 50A 10Hz,+12Vsb/2A; I/P: 264Vac,O/P With 1000uF	12.340	11.800	12.080	11.740	3.300	2.760	PASS
+12V dynamic O/P: 49A to 98A 10Hz,+12Vsb/0A; I/P: 264Vac,O/P With 1000uF	12.260	11.720	12.060	11.820	3.280	2.700	PASS
+12V dynamic O/P: 49A to 98A 10Hz,+12Vsb/2A; I/P: 264Vac,O/P With 1000uF	12.260	11.720	12.020	11.700	3.200	2.740	PASS
+12V dynamic O/P: 1 to 50A 10KHz,+12Vsb/0A; I/P: 264Vac,O/P With 1000uF	12.360	11.760	12.160	11.880	3.460	2.640	PASS
+12V dynamic O/P: 1 to 50A 10KHz,+12Vsb/2A; I/P: 264Vac,O/P With 1000uF	12.360	11.760	12.140	11.720	3.340	2.660	PASS
+12V dynamic O/P: 49A to 98A 10KHz,+12Vsb/0A; I/P: 264Vac,O/P With 1000uF	12.300	11.720	12.100	11.800	3.380	2.600	PASS
+12V dynamic O/P: 49A to 98A 10KHz,+12Vsb/2A; I/P: 264Vac,O/P With 1000uF	12.300	11.720	12.100	11.660	3.400	2.540	PASS



+12V dynamic O/P: 1A to 42A 10Hz,+12Vsb/0.05A; I/P: 90Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current



+12V dynamic O/P: 1A to 42A 10Hz,+12Vsb/2A; I/P: 90Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current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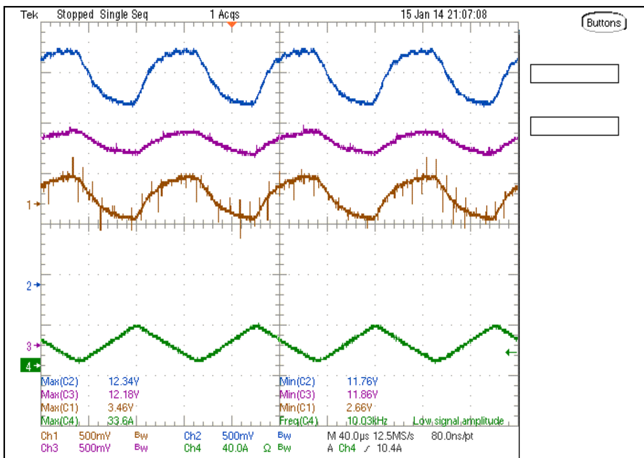	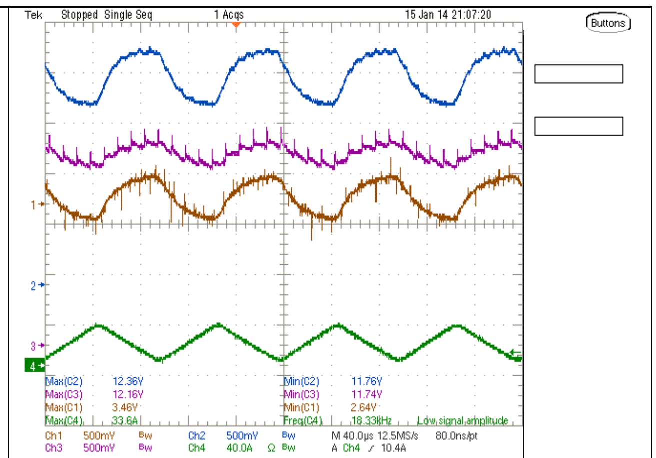
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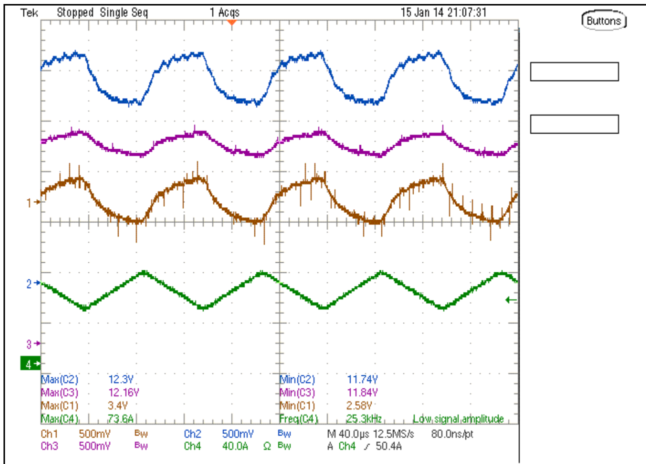	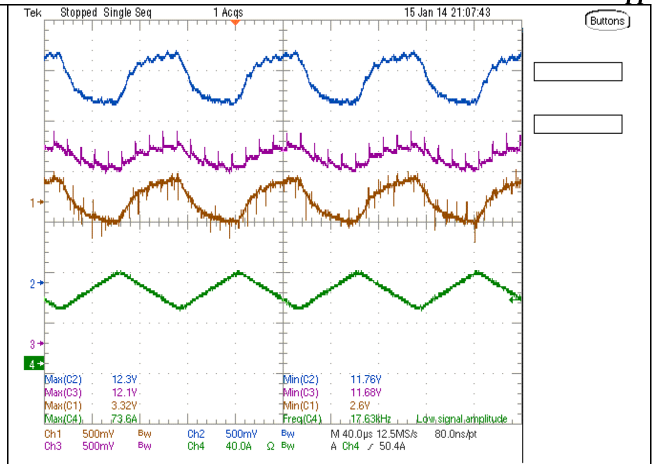
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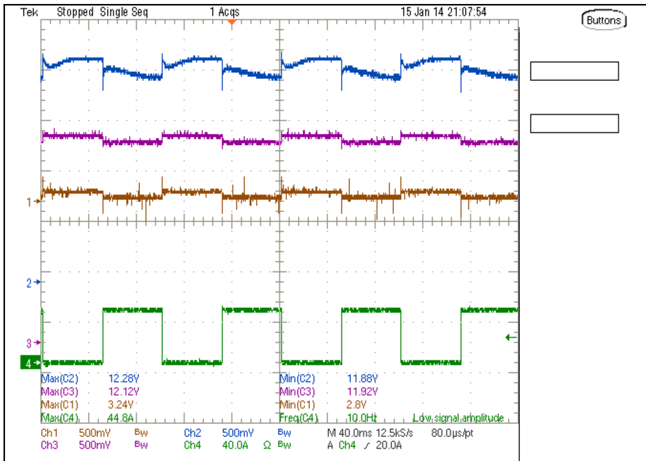
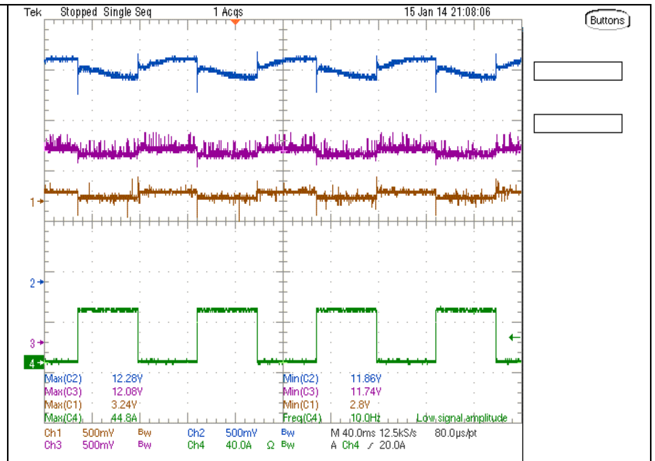
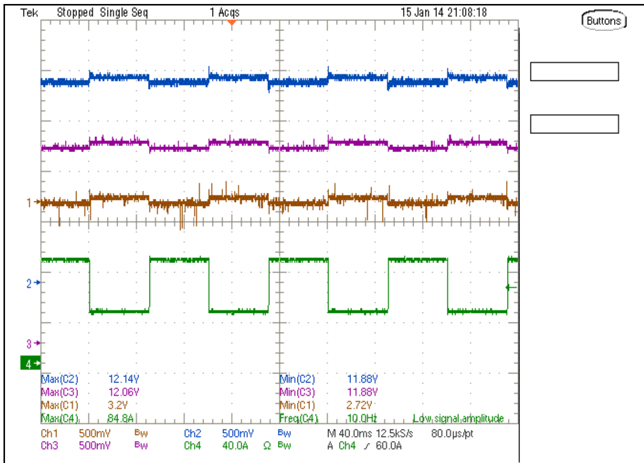
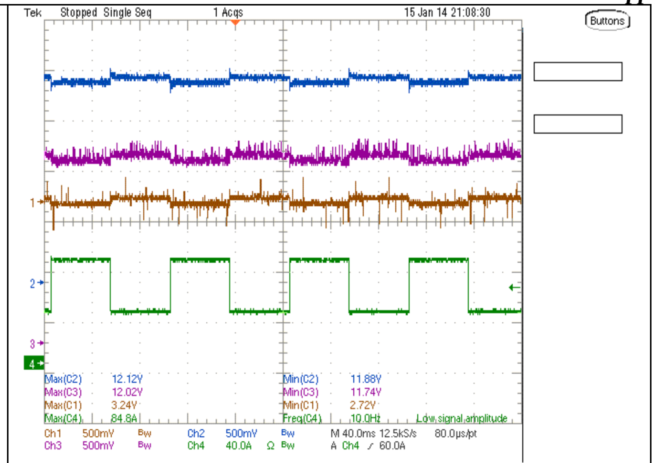
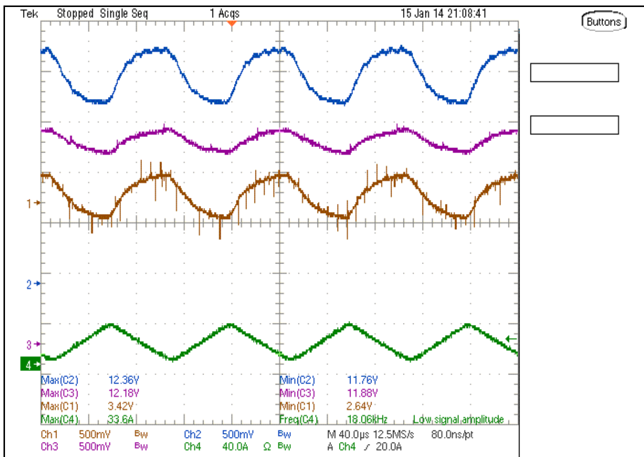
	
+12V dynamic O/P: 1A to 42A 10Hz,+12Vsb/0.05A; I/P: 100Vac,O/P With 1000uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12V Current	+12V dynamic O/P: 1A to 42A 10Hz,+12Vsb/2A; I/P: 100Vac,O/P With 1000uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12V Current



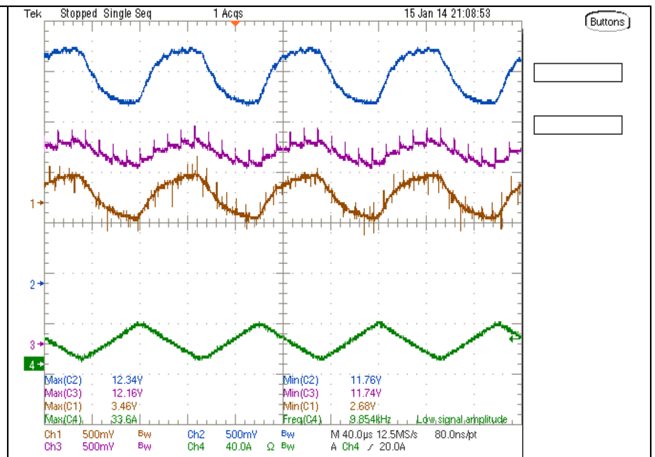
+12V dynamic O/P: 41A to 82A 10Hz,+12Vsb/0.05A; I/P: 100Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current



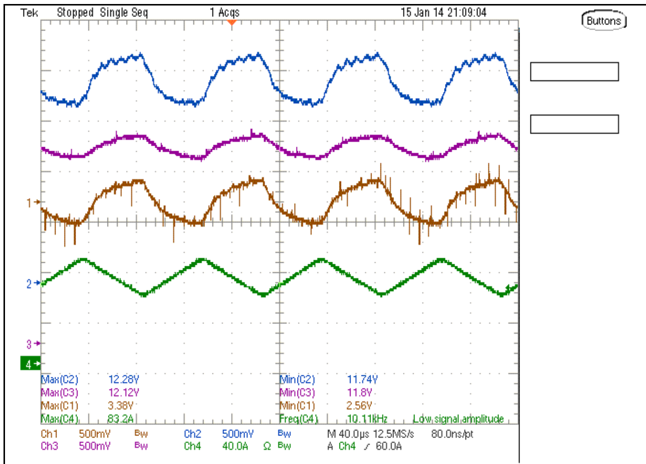
+12V dynamic O/P: 41A to 82A 10Hz,+12Vsb/2A; I/P: 100Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current



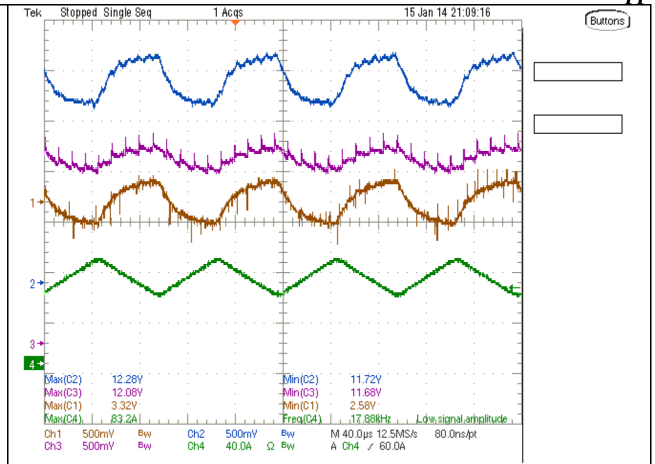
+12V dynamic O/P: 1A to 42A 10KHz,+12Vsb/0.05A; I/P: 100Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current



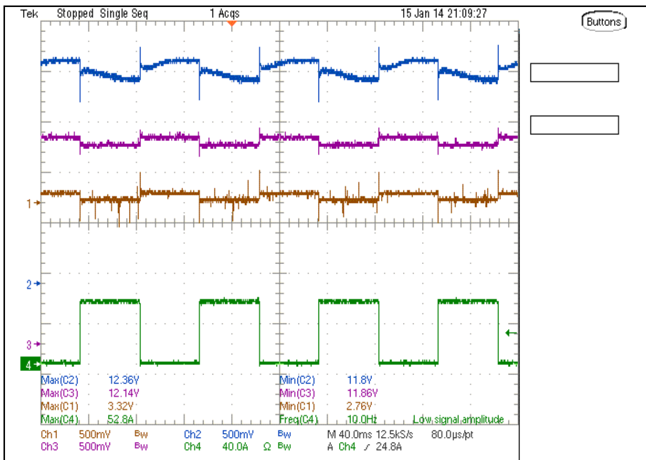
+12V dynamic O/P: 1A to 42A 10KHz,+12Vsb/2A; I/P: 100Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current



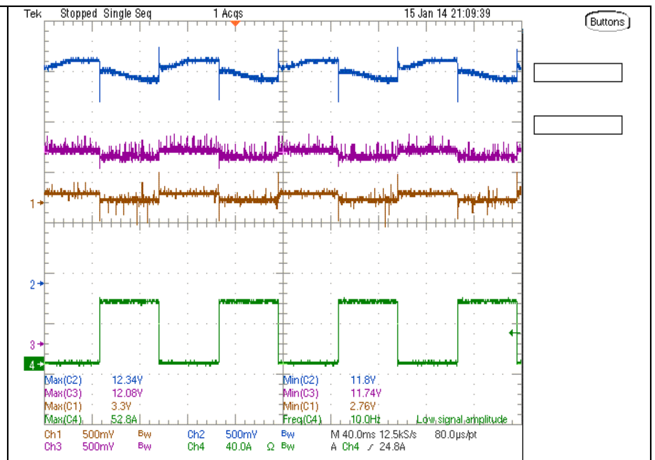
+12V dynamic O/P: 41A to 82A
10KHz,+12Vsb/0.05A; I/P: 100Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current



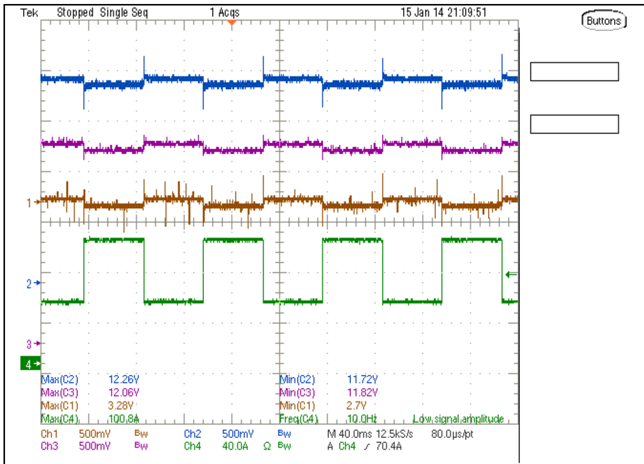
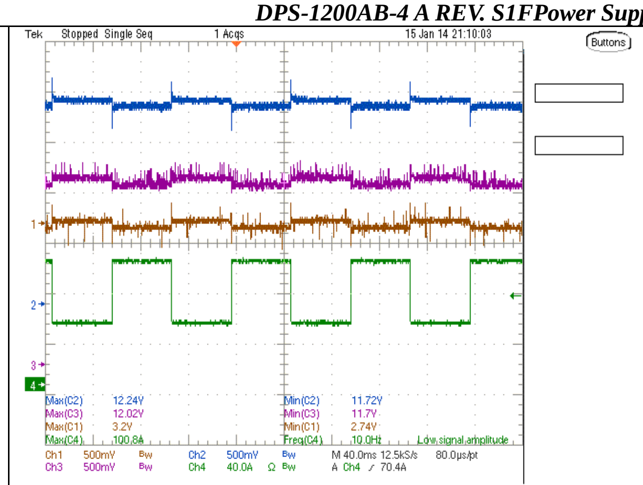
+12V dynamic O/P: 41A to 82A
10KHz,+12Vsb/2A; I/P: 100Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current

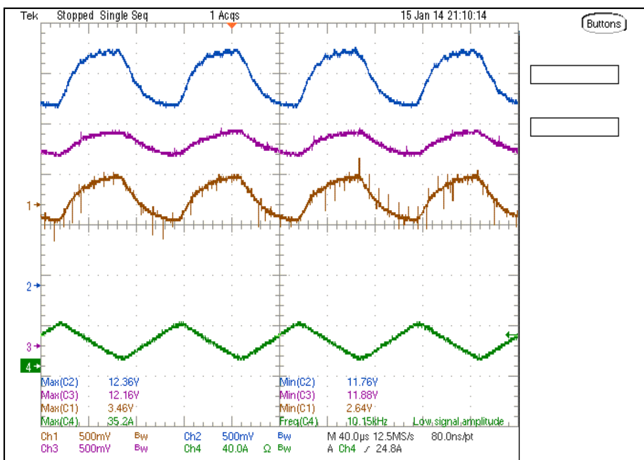
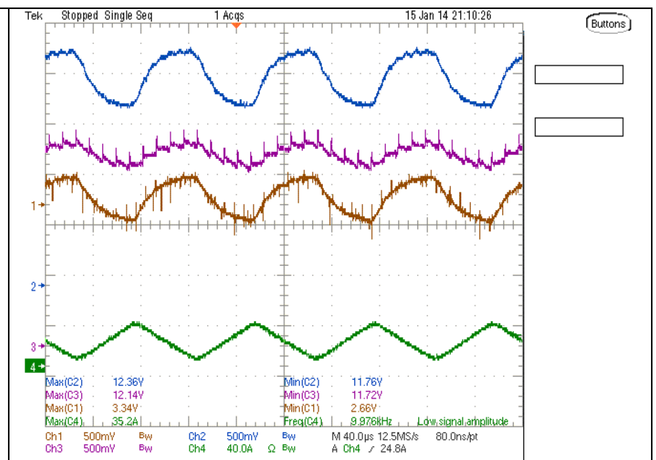


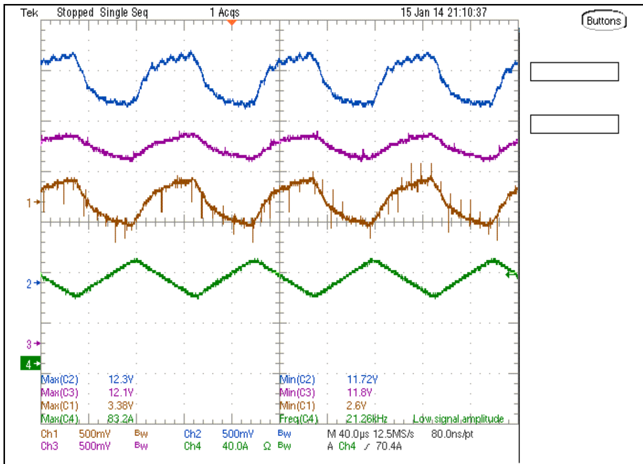
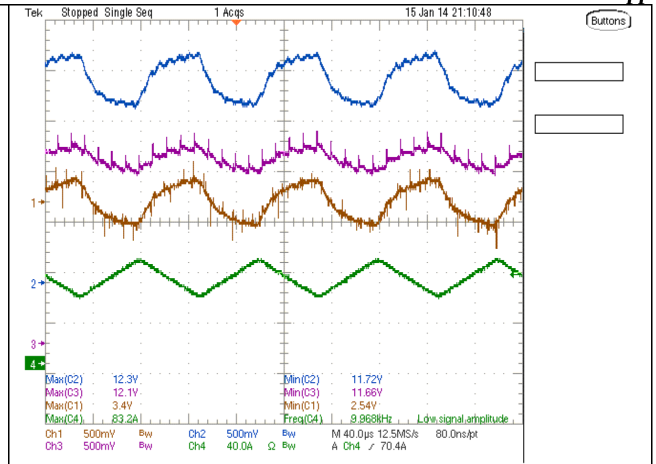
+12V dynamic O/P: 1 to 50A
10Hz,+12Vsb/0A; I/P: 264Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current



+12V dynamic O/P: 1 to 50A
10Hz,+12Vsb/2A; I/P: 264Vac,O/P With 1000uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12V Current

	
+12V dynamic O/P: 49A to 98A 10Hz,+12Vsb/0A; I/P: 264Vac,O/P With 1000uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12V Current	+12V dynamic O/P: 49A to 98A 10Hz,+12Vsb/2A; I/P: 264Vac,O/P With 1000uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12V Current

	
+12V dynamic O/P: 1 to 50A 10KHz,+12Vsb/0A; I/P: 264Vac,O/P With 1000uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12V Current	+12V dynamic O/P: 1 to 50A 10KHz,+12Vsb/2A; I/P: 264Vac,O/P With 1000uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12V Current

	
+12V dynamic O/P: 49A to 98A 10KHz,+12Vsb/0A; I/P: 264Vac,O/P With 1000uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12V Current	+12V dynamic O/P: 49A to 98A 10KHz,+12Vsb/2A; I/P: 264Vac,O/P With 1000uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12V Current

3.2.4.2 Dynamic (+12Vsb)

Test condition:
Sample NO.1
Vin : 90Vac/47Hz, 264Vac/63Hz
O/P Load : Max, Min Load
AMB : 0oC, 25℃, 50oC
Load slew rate = 0.5A /µSec
Frequency = 50Hz(10ms)

Numerical Result: PASS

AMB	AC Condition	Dwell time Level	12Vsb Load	12V Load	Test Reading (V)	
					Max	Min
0^oC	90Vac/47Hz	10ms	0.05A ⇔ 1.05A	0.5A	12.325	12.287
			0.05A ⇔ 1.05A	82A	12.237	12.131
			2A ⇔ 1A	0.5A	12.318	12.275
			2A ⇔ 1A	82A	12.231	12.118
	264Vac/63Hz		0.05A ⇔ 1.05A	0.5A	12.325	12.281
			0.05A ⇔ 1.05A	98A	12.243	12.112
			2A ⇔ 1A	0.5A	12.325	12.281
			2A ⇔ 1A	98A	12.243	12.112
SPEC					11.4V ~ 12.6V	

※ ATS TEST

AMB	AC Condition	Dwell time Level	12Vsb Load	12V Load	Test Reading (V)	
					Max	Min
25^oC	90Vac/47Hz	10ms	0.05A ⇔ 1.05A	0.5A	12.331	12.306
			0.05A ⇔ 1.05A	82A	12.212	12.125
			2A ⇔ 1A	0.5A	12.331	12.300
			2A ⇔ 1A	82A	12.212	12.125
	264Vac/63Hz		0.05A ⇔ 1.05A	0.5A	12.325	12.293
			0.05A ⇔ 1.05A	98A	12.225	12.118
			2A ⇔ 1A	0.5A	12.325	12.287
			2A ⇔ 1A	98A	12.225	12.118
SPEC					11.4V ~ 12.6V	

※ ATS TEST

AMB	AC Condition	Dwell time Level	12Vsb Load	12V Load	Test Reading (V)	
					Max	Min
50°C	90Vac/47Hz	10ms	0.05A ⇔ 1.05A	0.5A	12.318	12.293
			0.05A ⇔ 1.05A	82A	12.200	12.131
			2A ⇔ 1A	0.5A	12.325	12.293
			2A ⇔ 1A	82A	12.206	12.137
	264Vac/63Hz		0.05A ⇔ 1.05A	0.5A	12.325	12.293
			0.05A ⇔ 1.05A	98A	12.212	12.131
			2A ⇔ 1A	0.5A	12.325	12.293
			2A ⇔ 1A	98A	12.206	12.118
SPEC					11.4V ~ 12.6V	

※ **ATS TEST**

3.2.4.2 Dynamic (+12Vsb)

Test conditions:

Sample NO.1

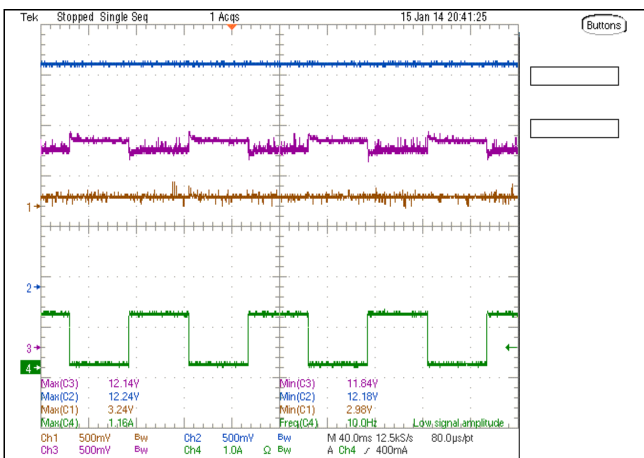
AMB. 25℃

Capacitive Load: +12V/1000uF; +12Vsb/100uF

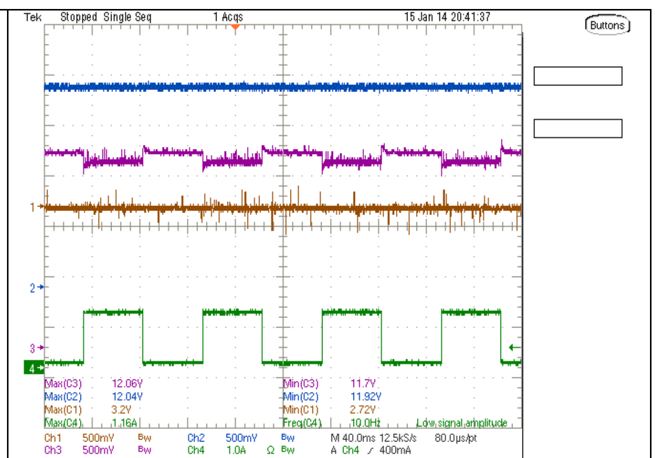
Graphical Result: PASS

	+12Vsb		+12V		PW_OK		
Test Condition	Max(V)	Min(V)	Max(V)	Min(V)	Max(V)	Min(V)	Result
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz +12V/0.5A; I/P: 90Vac,O/P With 1,00uF	12.000	11.840	12.240	12.180	3.240	2.980	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz +12V/82A; I/P: 90Vac,O/P With 1,00uF	12.140	11.700	12.040	11.920	3.200	2.720	PASS
+12Vsb dynamic O/P: 1A to 2A 10Hz +12V/0.5A; I/P: 90Vac,O/P With 1,00uF	12.100	11.860	12.240	12.180	3.220	2.980	PASS
+12Vsb dynamic O/P: 1A to 2A 10Hz +12V/82A; I/P: 90Vac,O/P With 1,00uF	12.100	11.720	12.040	11.920	3.180	2.720	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz +12V/0.5A; I/P: 90Vac,O/P With 1,00uF	11.980	11.880	12.260	12.160	3.220	2.960	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz +12V/82A; I/P: 90Vac,O/P With 1,00uF	12.040	11.760	12.040	11.920	3.180	2.720	PASS
+12Vsb dynamic O/P: 1A to 2A 10KHz +12V/0.5A; I/P: 90Vac,O/P With 1,00uF	12.040	11.840	12.240	12.160	3.240	2.960	PASS
+12Vsb dynamic O/P: 1A to 2A 10KHz +12V/82A; I/P: 90Vac,O/P With 1,00uF	12.140	11.720	12.040	11.900	3.180	2.720	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz +12V/0.5A; I/P: 100Vac,O/P With 1,00uF	12.040	11.860	12.260	12.160	3.240	2.980	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz +12V/82A; I/P: 100Vac,O/P With 1,00uF	12.160	11.720	12.040	11.920	3.200	2.720	PASS
+12Vsb dynamic O/P: 1A to 2A 10Hz +12V/0.5A; I/P: 100Vac,O/P With 1,00uF	12.100	11.840	12.260	12.180	3.220	2.980	PASS
+12Vsb dynamic O/P: 1A to 2A 10Hz +12V/82A; I/P: 100Vac,O/P With 1,00uF	12.100	11.720	12.040	11.920	3.180	2.720	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz +12V/0.5A; I/P: 100Vac,O/P With 1,00uF	12.020	11.880	12.240	12.180	3.240	2.960	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz +12V/82A; I/P: 100Vac,O/P With 1,00uF	12.040	11.760	12.040	11.920	3.180	2.720	PASS

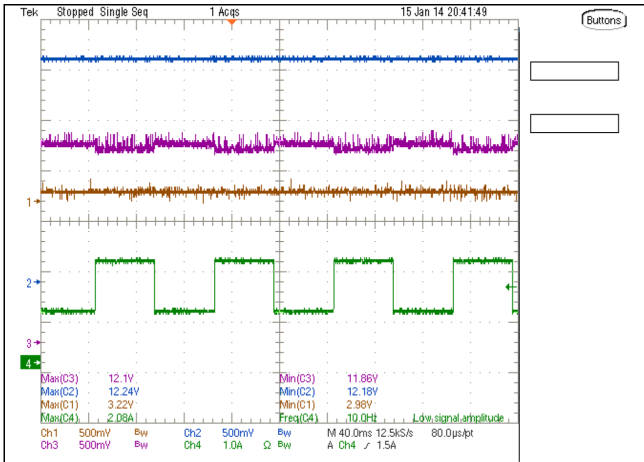
+12Vsb dynamic O/P: 1A to 2A 10KHz +12V/0.5A; I/P: 100Vac,O/P With 1,00uF	12.140	11.840	12.240	12.160	3.240	2.980	PASS
+12Vsb dynamic O/P: 1A to 2A 10KHz +12V/82A; I/P: 100Vac,O/P With 1,00uF	12.040	11.700	12.040	11.920	3.180	2.700	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz +12V/0.5A; I/P: 264Vac,O/P With 1,00uF	12.040	11.840	12.260	12.180	3.240	2.980	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz +12V/98A; I/P: 264Vac,O/P With 1,00uF	11.980	11.700	12.020	11.900	3.160	2.660	PASS
+12Vsb dynamic O/P: 1A to 2A 10Hz +12V/0.5A; I/P: 264Vac,O/P With 1,00uF	11.980	11.840	12.240	12.180	3.220	2.980	PASS
+12Vsb dynamic O/P: 1A to 2A 10Hz +12V/98A; I/P: 264Vac,O/P With 1,00uF	12.100	11.700	12.020	11.900	3.160	2.660	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz +12V/0.5A; I/P: 264Vac,O/P With 1,00uF	12.160	11.900	12.260	12.180	3.220	2.980	PASS
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz +12V/98A; I/P: 264Vac,O/P With 1,00uF	12.020	11.740	12.020	11.880	3.180	2.680	PASS
+12Vsb dynamic O/P: 1A to 2A 10KHz +12V/0.5A; I/P: 264Vac,O/P With 1,00uF	12.140	11.840	12.240	12.180	3.240	2.960	PASS
+12Vsb dynamic O/P: 1A to 2A 10KHz +12V/98A; I/P: 264Vac,O/P With 1,00uF	12.140	11.680	12.020	11.900	3.180	2.680	PASS



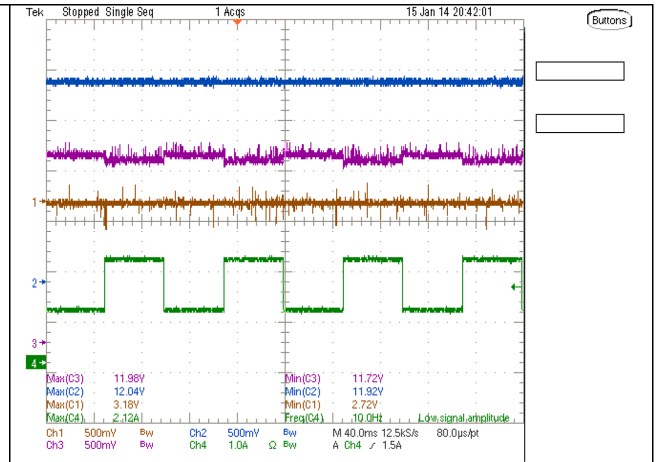
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz +12V/0.5A; I/P: 90Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



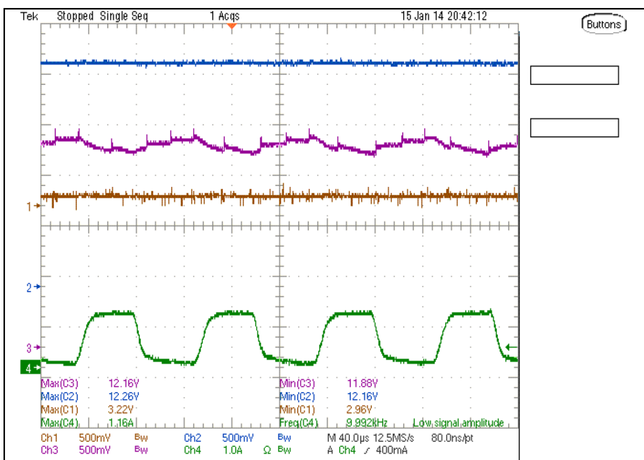
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz +12V/82A; I/P: 90Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



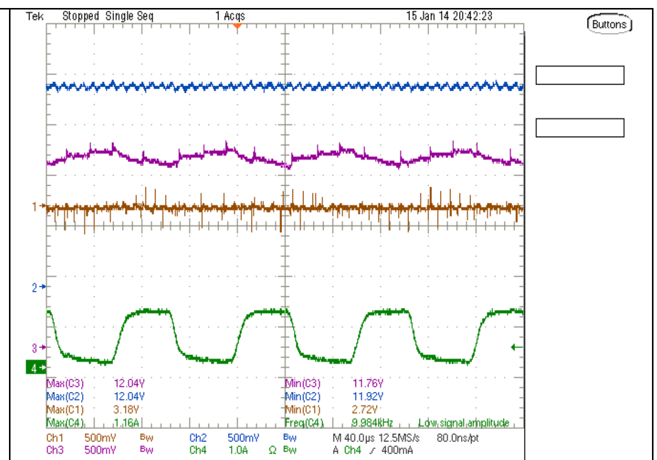
+12Vsb dynamic O/P: 1A to 2A 10Hz
+12V/0.5A; I/P: 90Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



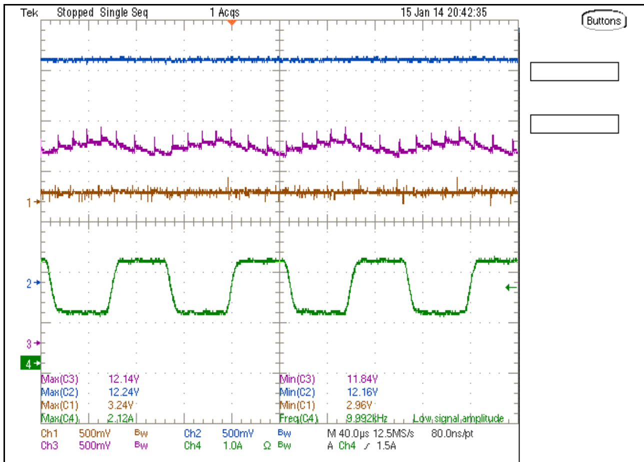
+12Vsb dynamic O/P: 1A to 2A 10Hz
+12V/82A; I/P: 90Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



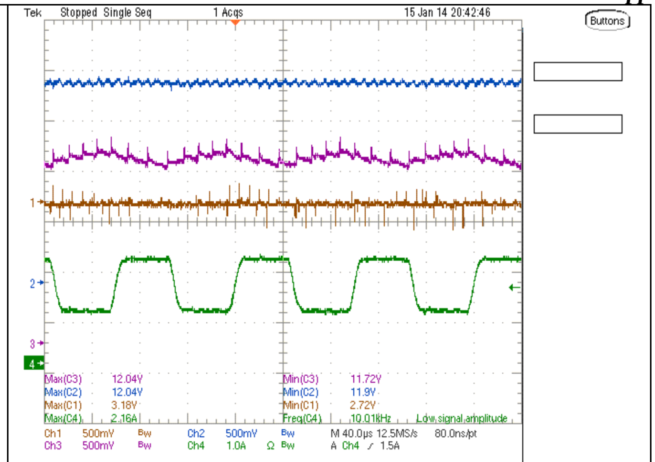
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz
+12V/0.5A; I/P: 90Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



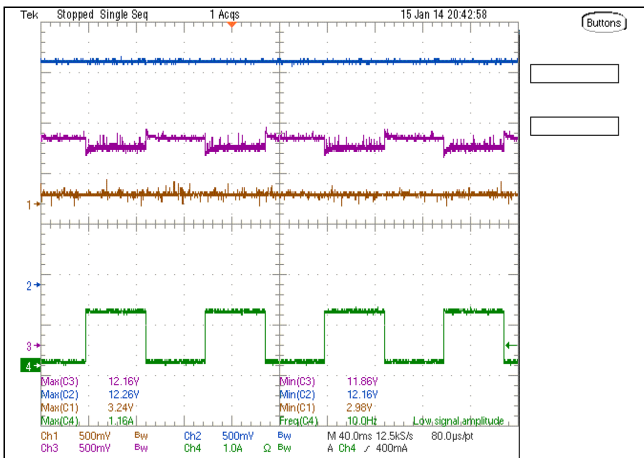
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz
+12V/82A; I/P: 90Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



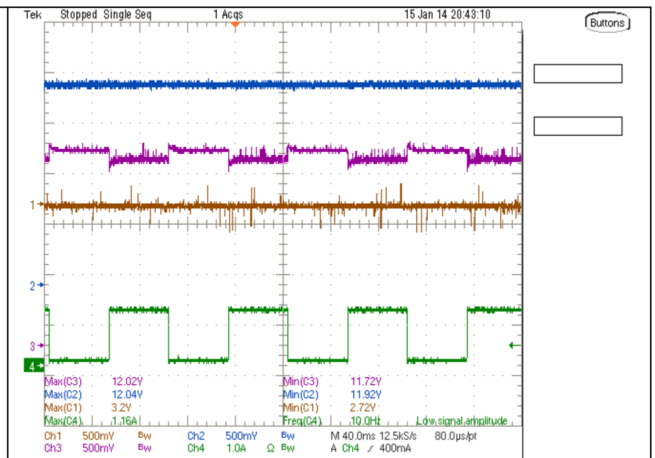
+12Vsb dynamic O/P: 1A to 2A 10KHz
+12V/0.5A; I/P: 90Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



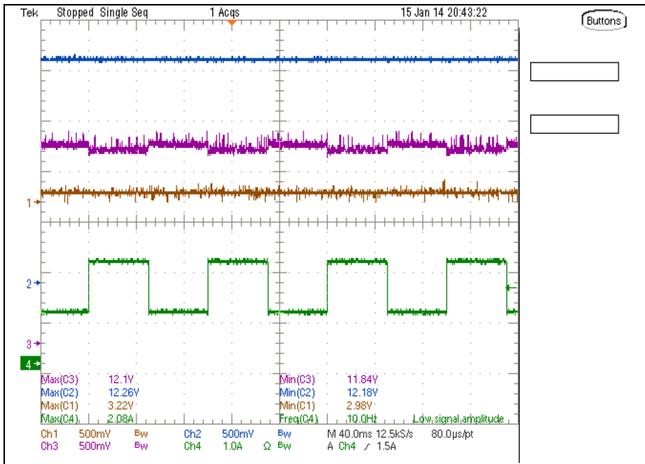
+12Vsb dynamic O/P: 1A to 2A 10KHz
+12V/82A; I/P: 90Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



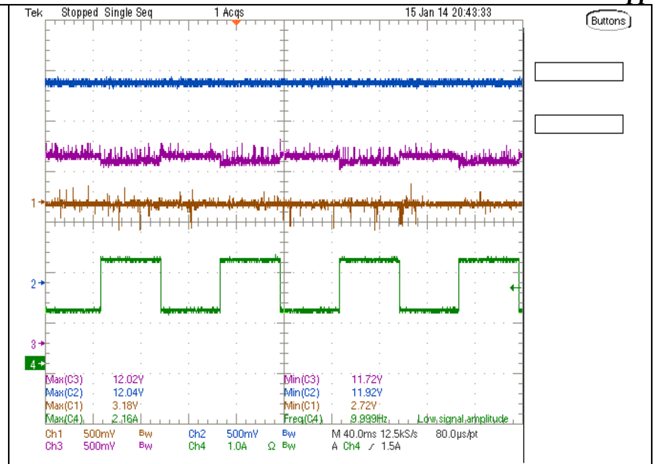
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz
+12V/0.5A; I/P: 100Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



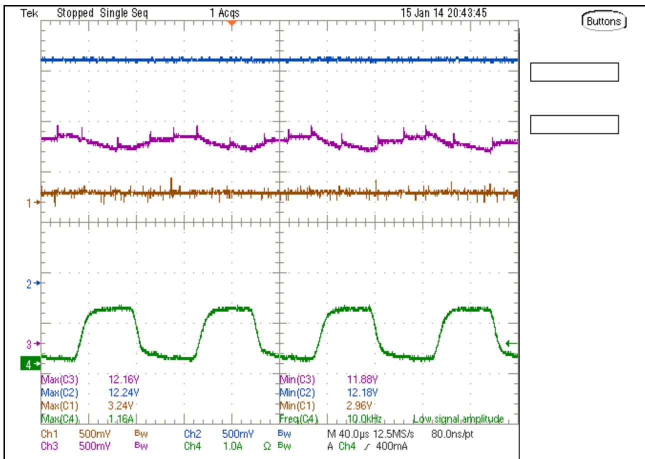
+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz
+12V/82A; I/P: 100Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



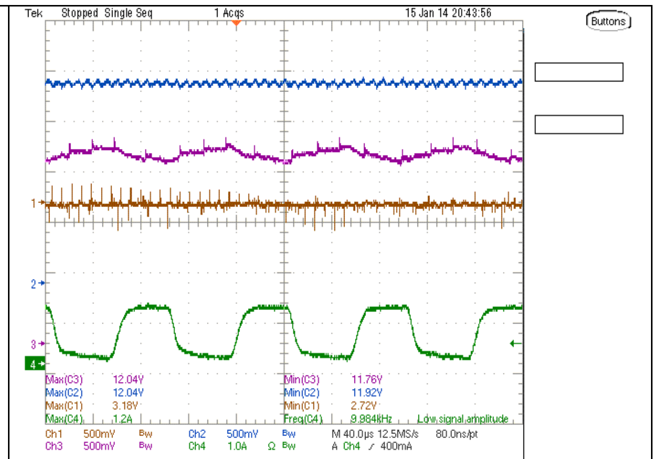
+12Vsb dynamic O/P: 1A to 2A 10Hz
+12V/0.5A; I/P: 100Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



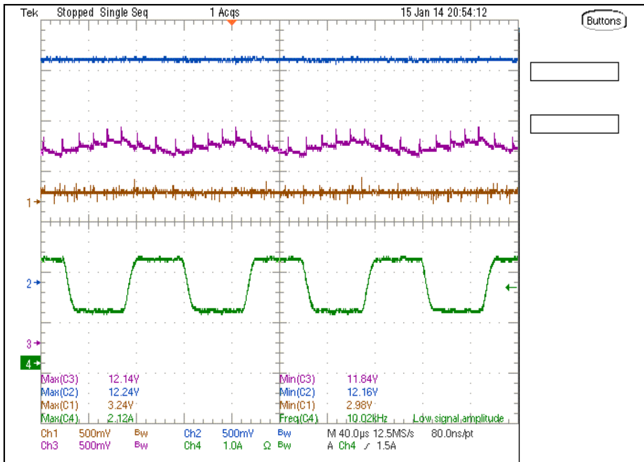
+12Vsb dynamic O/P: 1A to 2A 10Hz
+12V/82A; I/P: 100Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



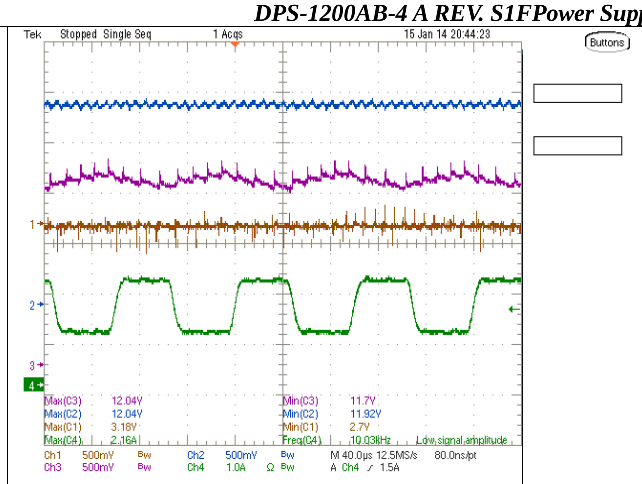
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz
+12V/0.5A; I/P: 100Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



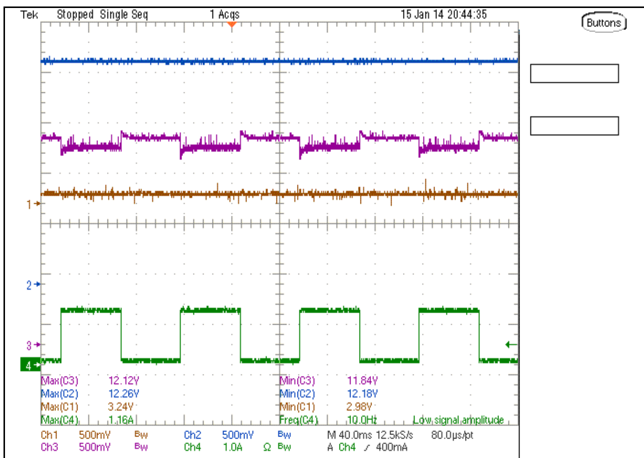
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz
+12V/82A; I/P: 100Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



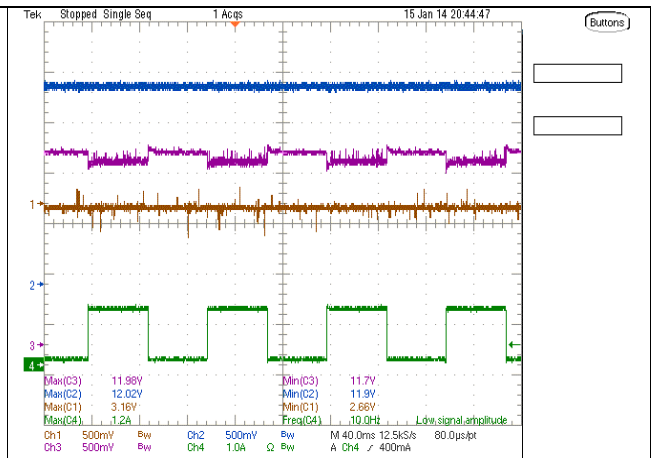
+12Vsb dynamic O/P: 1A to 2A 10KHz
+12V/0.5A; I/P: 100Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



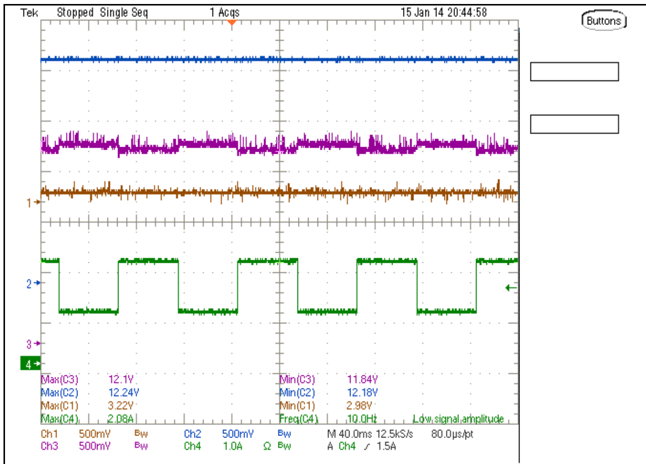
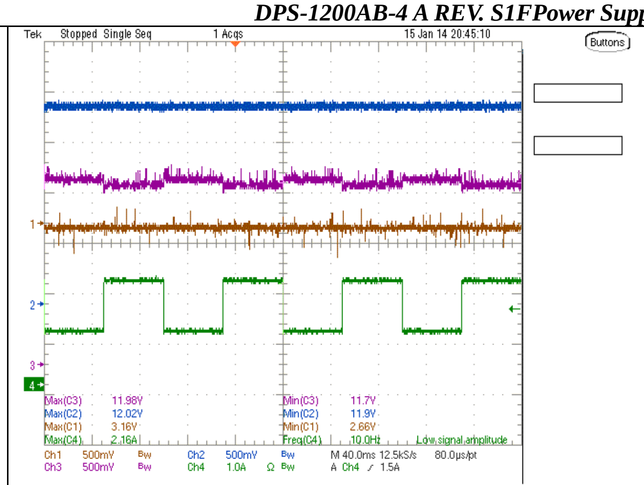
+12Vsb dynamic O/P: 1A to 2A 10KHz
+12V/82A; I/P: 100Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current

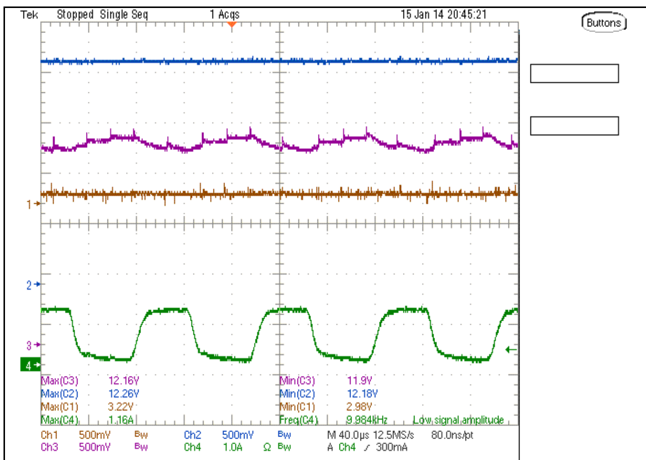
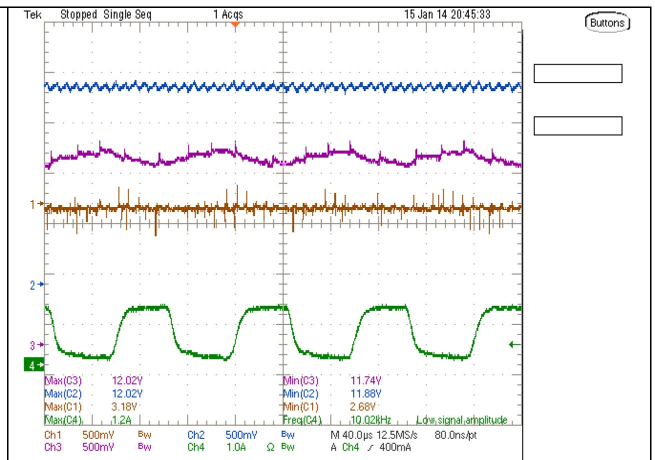


+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz
+12V/0.5A; I/P: 264Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current



+12Vsb dynamic O/P: 0.05A to 1.05A 10Hz
+12V/98A; I/P: 264Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current

	
+12Vsb dynamic O/P: 1A to 2A 10Hz +12V/0.5A; I/P: 264Vac,O/P With 1,00uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12Vsb Current	+12Vsb dynamic O/P: 1A to 2A 10Hz +12V/98A; I/P: 264Vac,O/P With 1,00uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12Vsb Current

	
+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz +12V/0.5A; I/P: 264Vac,O/P With 1,00uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12Vsb Current	+12Vsb dynamic O/P: 0.05A to 1.05A 10KHz +12V/98A; I/P: 264Vac,O/P With 1,00uF CH1: PWOK (Offset 3V) CH2: +12V (Offset 10V) CH3: +12Vsb (Offset 10V) CH4: +12Vsb Current

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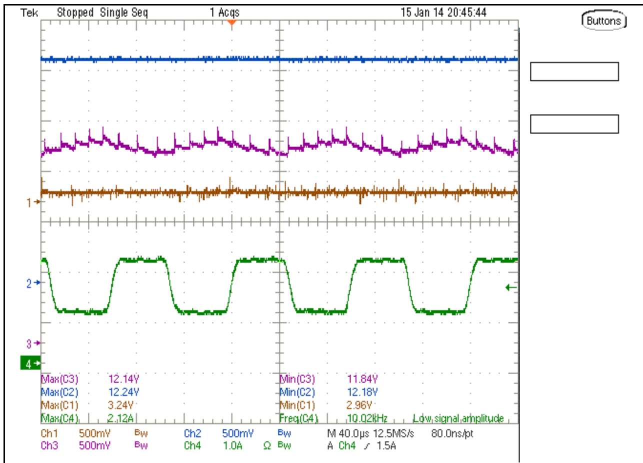
<td>
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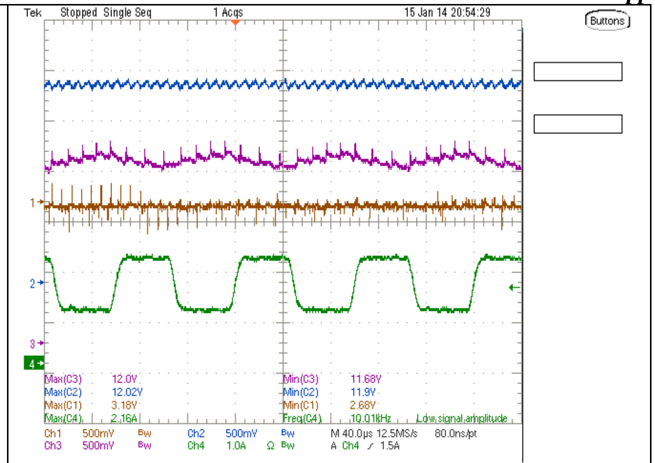
<td>
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<tr>
<td>+12Vsb dynamic O/P: 1A to 2A 10KHz
+12V/0.5A; I/P: 264Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current</td>
<td>+12Vsb dynamic O/P: 1A to 2A 10KHz
+12V/98A; I/P: 264Vac,O/P With 1,00uF
CH1: PWOK (Offset 3V)
CH2: +12V (Offset 10V)
CH3: +12Vsb (Offset 10V)
CH4: +12Vsb Current</td>
</tr>
</table>

3.2.5 Audible Noise

No abnormal audible noise is allowed to be generated by the PSU

3.2.6 Residual Voltage

If the PSU is switched OFF, the residual voltage at any DC output is less than 100mV. No negative effects shall occur if a voltage up to 500mV is externally applied to any PSU output after the PSU is switched OFF.

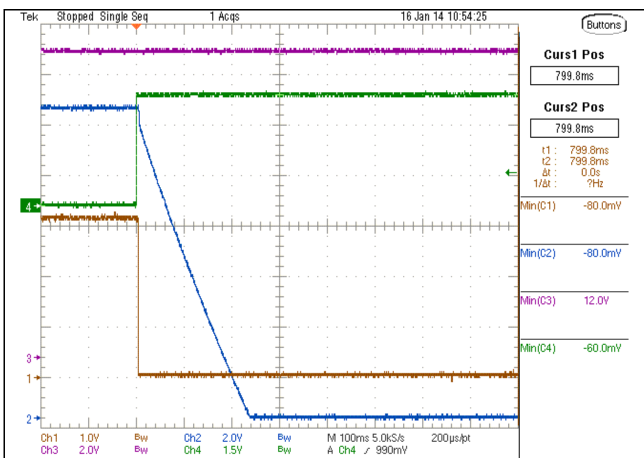
Test condition:

Sample NO.1

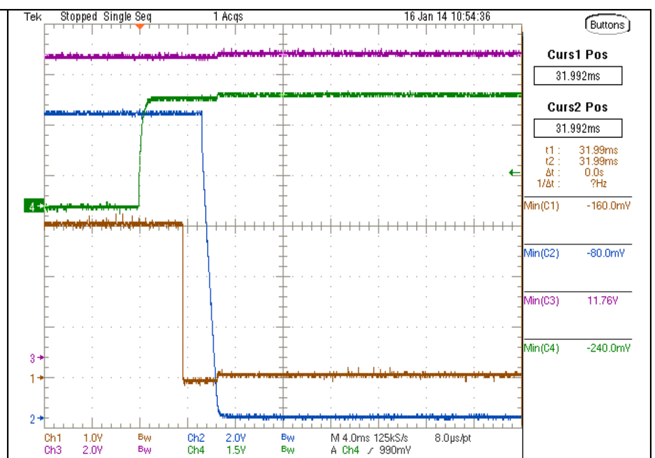
AMB. 25℃

Graphical Result: PASS

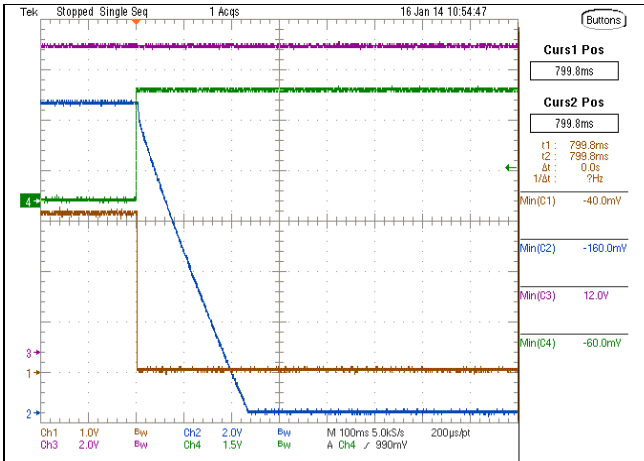
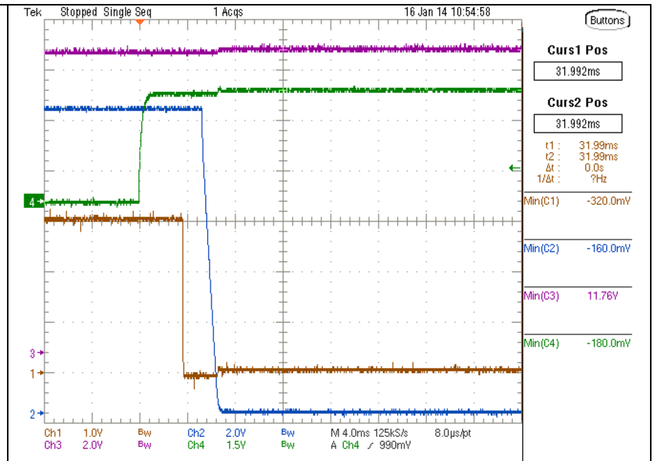
Test Condition	Spec Max (V)	Reading (V)	Result
Power Turn off Time (Residual Voltage); I/P:90Vac,O/P:Min load	0.100	-0.080	PASS
Power Turn off Time (Residual Voltage); I/P:90Vac,O/P:Max load	0.100	-0.160	PASS
Power Turn off Time (Residual Voltage); I/P:100Vac,O/P:Min load	0.100	-0.040	PASS
Power Turn off Time (Residual Voltage); I/P:100Vac,O/P:Max load	0.100	-0.320	PASS
Power Turn off Time (Residual Voltage); I/P:200Vac,O/P:Min load	0.100	-0.080	PASS
Power Turn off Time (Residual Voltage); I/P:200Vac,O/P:Max load	0.100	-0.160	PASS
Power Turn off Time (Residual Voltage); I/P:264Vac,O/P:Min load	0.100	-0.080	PASS
Power Turn off Time (Residual Voltage); I/P:264Vac,O/P:Max load	0.100	-0.200	PASS

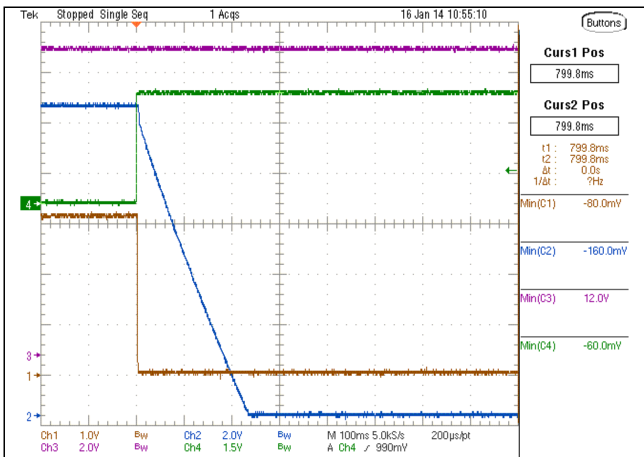
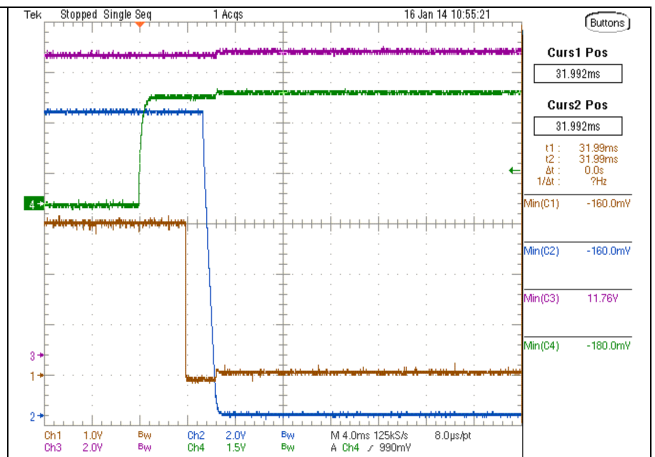


Power Turn off Time (Residual Voltage);
I/P:90Vac,O/P:Min load
CH1: PWOK
CH2: +12V
CH3: +12Vsb
CH4: PSON#



Power Turn off Time (Residual Voltage);
I/P:90Vac,O/P:Max load
CH1: PWOK
CH2: +12V
CH3: +12Vsb
CH4: PSON#

	
Power Turn off Time (Residual Voltage); I/P:100Vac,O/P:Min load CH1: PWOK CH2: +12V CH3: +12Vsb CH4: PSON#	Power Turn off Time (Residual Voltage); I/P:100Vac,O/P:Max load CH1: PWOK CH2: +12V CH3: +12Vsb CH4: PSON#

	
Power Turn off Time (Residual Voltage); I/P:200Vac,O/P:Min load CH1: PWOK CH2: +12V CH3: +12Vsb CH4: PSON#	Power Turn off Time (Residual Voltage); I/P:200Vac,O/P:Max load CH1: PWOK CH2: +12V CH3: +12Vsb CH4: PSON#

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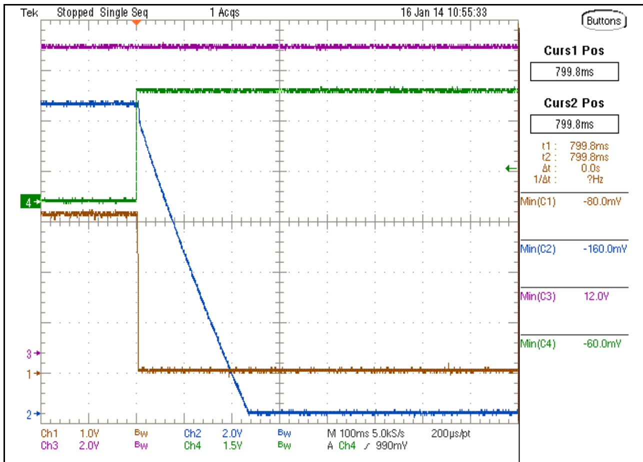
<td>
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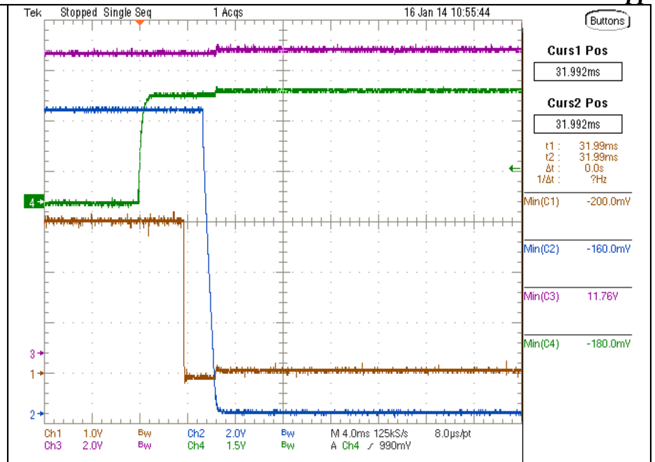
<td>
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<td>Power Turn off Time (Residual Voltage);
I/P:264Vac,O/P:Min load
CH1: PWOK
CH2: +12V
CH3: +12Vsb
CH4: PSON#</td>
<td>Power Turn off Time (Residual Voltage);
I/P:264Vac,O/P:Max load
CH1: PWOK
CH2: +12V
CH3: +12Vsb
CH4: PSON#</td>
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</table>

3.2.7 Capacitive Loading

The power supply is stable and meets all requirements with the following capacitors.

Table 10: Capacitive Loading

	Min	**Max**
+12V	1,000μF	25,000μF
+12VSB	100μF	5000μF

3.2.7 Capacitive Loading (Tvout_rise)

12Vsb Output voltage rise time.

Test conditions:

Sample NO.1

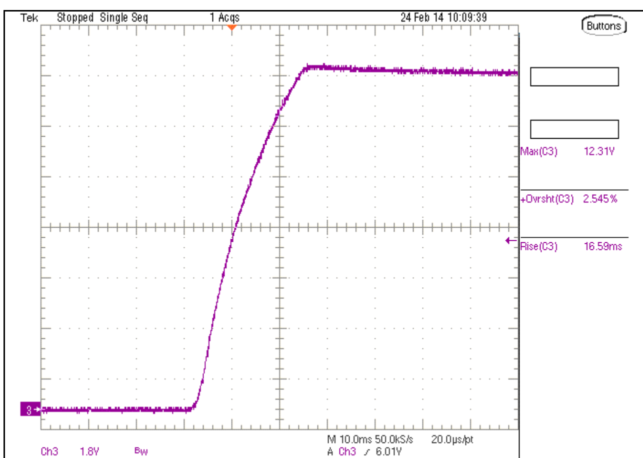
AMB. 25℃

Spec: T_{sb_rise}: 1~25ms

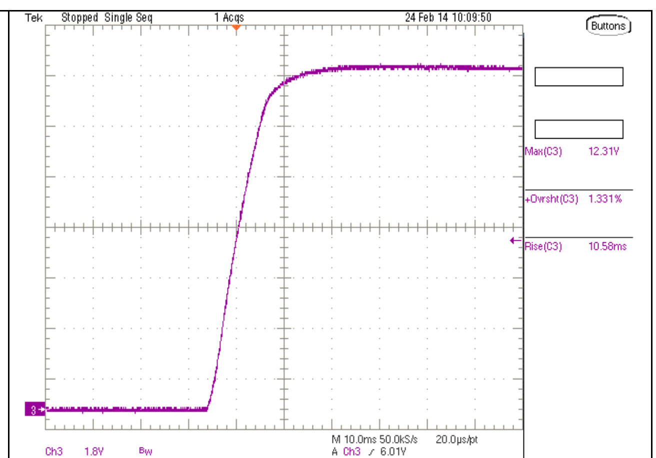
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

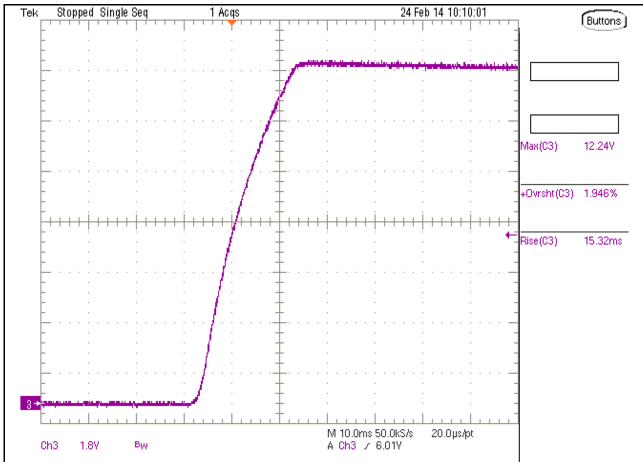
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12Vsb rise time (T2); I/P: 90Vac,O/P:Max load ,O/P With Max Cap	50	1	16.592	PASS
+12Vsb rise time (T2); I/P: 90Vac,O/P:Min load ,O/P With Max Cap	50	1	10.584	PASS
+12Vsb rise time (T2); I/P: 100Vac,O/P:Max load ,O/P With Max Cap	50	1	15.325	PASS
+12Vsb rise time (T2); I/P: 100Vac,O/P:Min load ,O/P With Max Cap	50	1	10.384	PASS
+12Vsb rise time (T2); I/P: 180Vac,O/P:Max load ,O/P With Max Cap	50	1	10.856	PASS
+12Vsb rise time (T2); I/P: 180Vac,O/P:Min load ,O/P With Max Cap	50	1	10.304	PASS
+12Vsb rise time (T2); I/P: 264Vac,O/P:Max load ,O/P With Max Cap	50	1	10.547	PASS
+12Vsb rise time (T2); I/P: 264Vac,O/P:Min load ,O/P With Max Cap	50	1	10.404	PASS



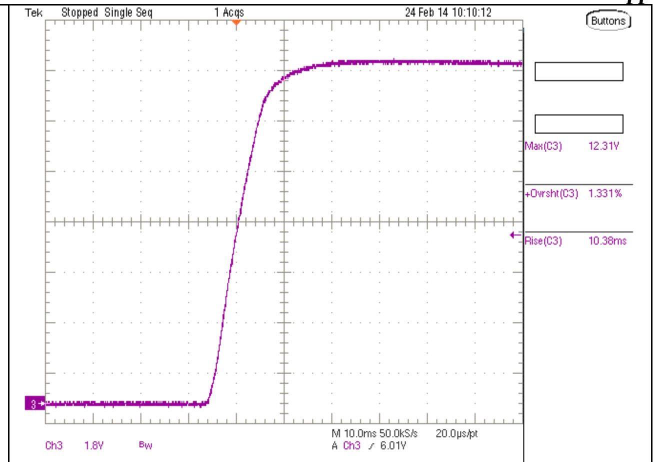
+12Vsb rise time (T2); I/P: 90Vac,O/P:Max load ,O/P With Max Cap
CH3: +12Vsb



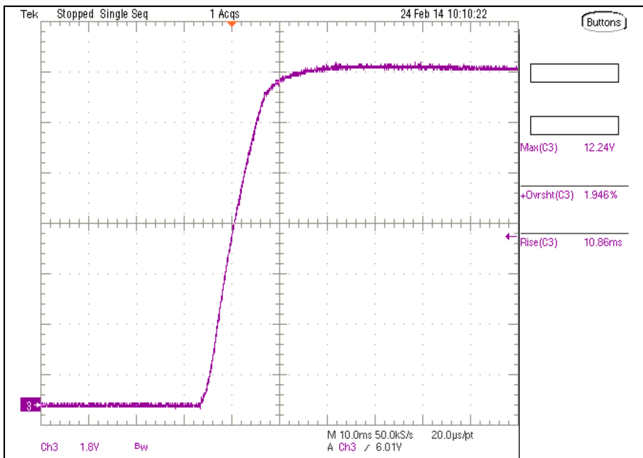
+12Vsb rise time (T2); I/P: 90Vac,O/P:Min load ,O/P With Max Cap
CH3: +12Vsb



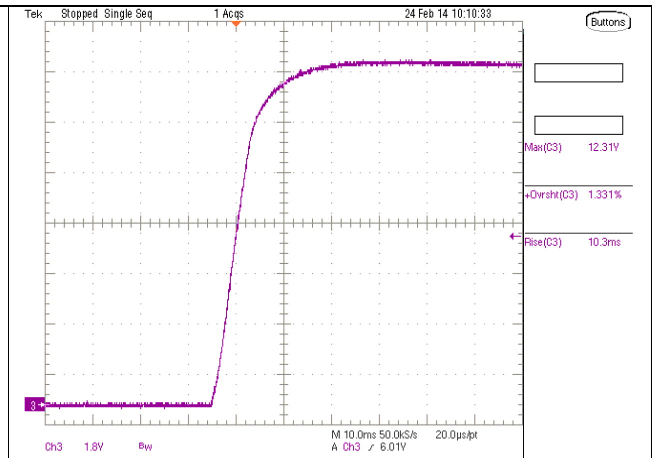
+12Vsb rise time (T2); I/P: 100Vac,O/P:Max load ,O/P With Max Cap
CH3: +12Vsb



+12Vsb rise time (T2); I/P: 100Vac,O/P:Min load ,O/P With Max Cap
CH3: +12Vsb



+12Vsb rise time (T2); I/P: 200Vac,O/P:Max load ,O/P With Max Cap
CH3: +12Vsb



+12Vsb rise time (T2); I/P: 200Vac,O/P:Min load ,O/P With Max Cap
CH3: +12Vsb

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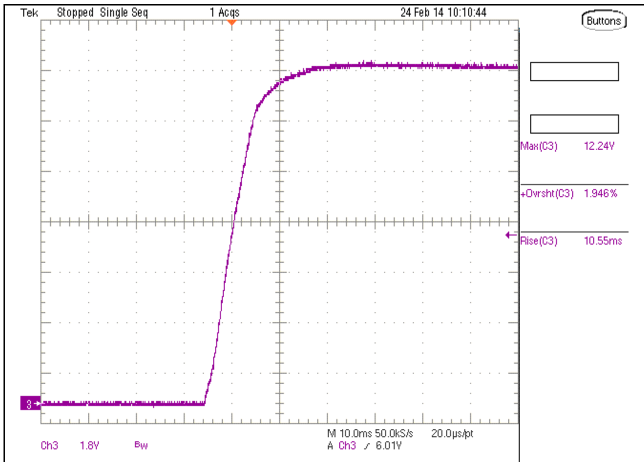
<td>
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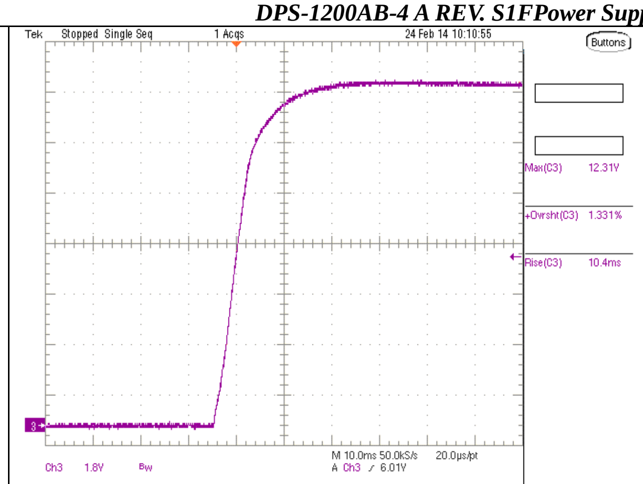
<td>
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<td>+12Vsb rise time (T2); I/P: 264Vac,O/P:Max load ,O/P With Max Cap
CH3: +12Vsb</td>
<td>+12Vsb rise time (T2); I/P: 264Vac,O/P:Min load ,O/P With Max Cap
CH3: +12Vsb</td>
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</table>

3.2.7 Capacitive Loading (Tvout_rise)

12V Output voltage rise time.

Test conditions:

Sample NO.1

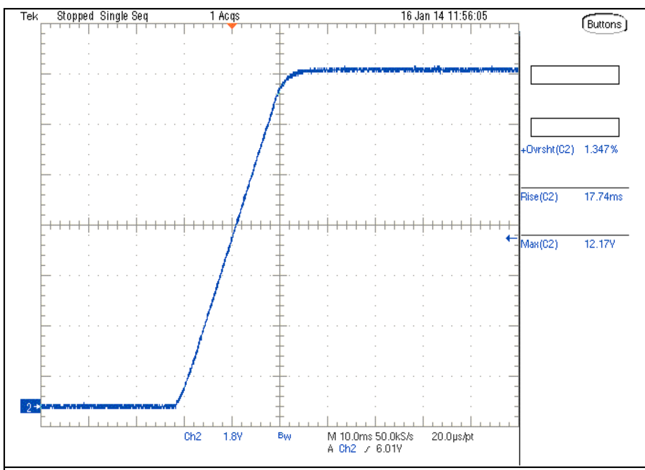
AMB. 25℃

Spec: T_{vout_rise}: 5~70ms

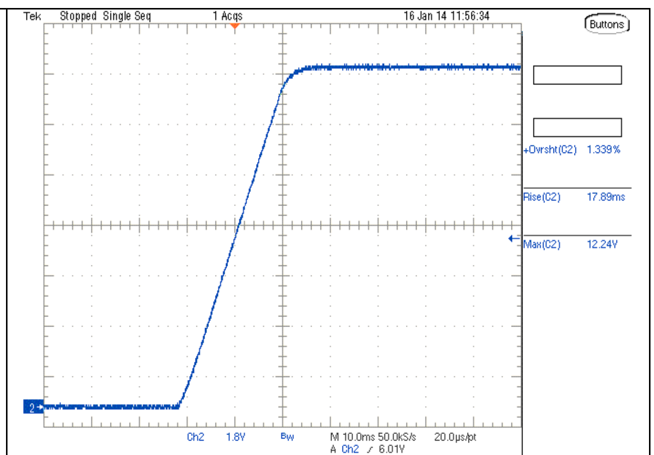
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

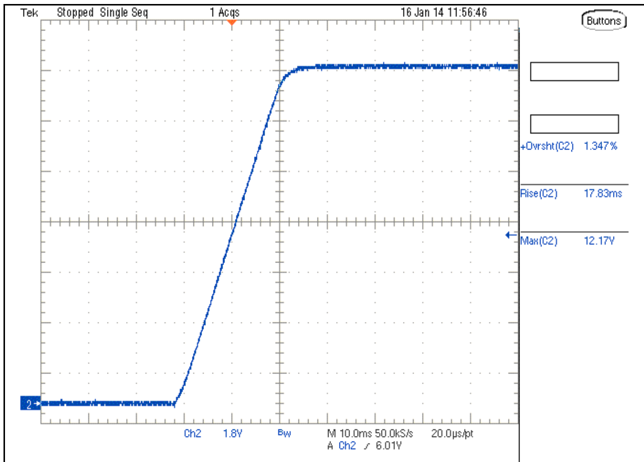
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12V rise time (T3); I/P: 90Vac,O/P:Max load ,O/P With Max Cap	70	5	17.736	PASS
+12V rise time (T3); I/P: 90Vac,O/P:Min load ,O/P With Max Cap	70	5	17.888	PASS
+12V rise time (T3); I/P: 100Vac,O/P:Max load ,O/P With Max Cap	70	5	17.832	PASS
+12V rise time (T3); I/P: 100Vac,O/P:Min load ,O/P With Max Cap	70	5	17.854	PASS
+12V rise time (T3); I/P: 180Vac,O/P:Max load ,O/P With Max Cap	70	5	17.686	PASS
+12V rise time (T3); I/P: 180Vac,O/P:Min load ,O/P With Max Cap	70	5	17.848	PASS
+12V rise time (T3); I/P: 264Vac,O/P:Max load ,O/P With Max Cap	70	5	17.546	PASS
+12V rise time (T3); I/P: 264Vac,O/P:Min load ,O/P With Max Cap	70	5	17.979	PASS



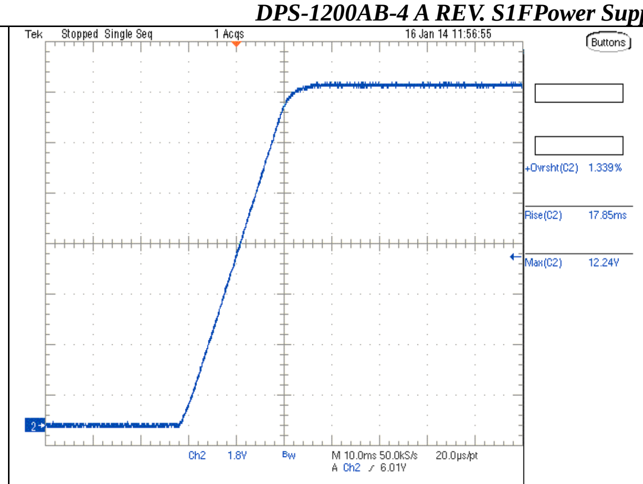
+12V rise time (T3); I/P: 90Vac,O/P:Max load ,O/P With Max Cap
CH2: +12V



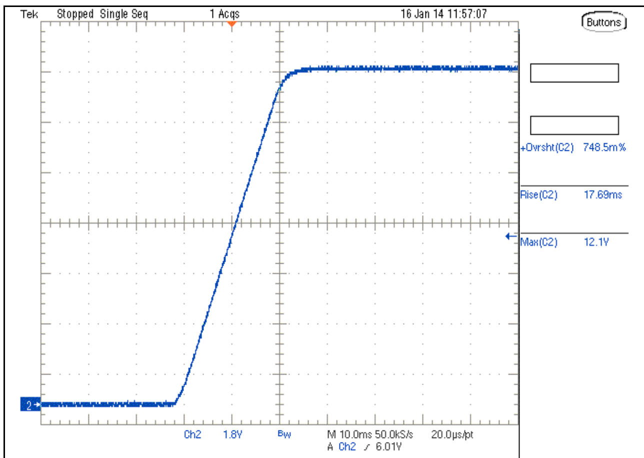
+12V rise time (T3); I/P: 90Vac,O/P:Min load ,O/P With Max Cap
CH2: +12V



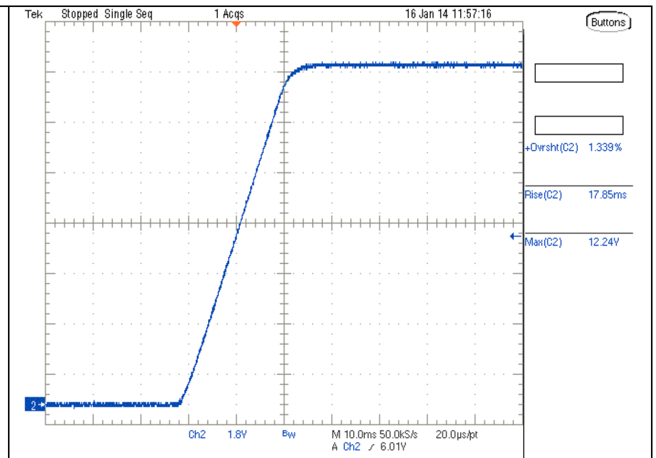
+12V rise time (T3); I/P: 100Vac,O/P:Max load ,O/P With Max Cap
CH2: +12V



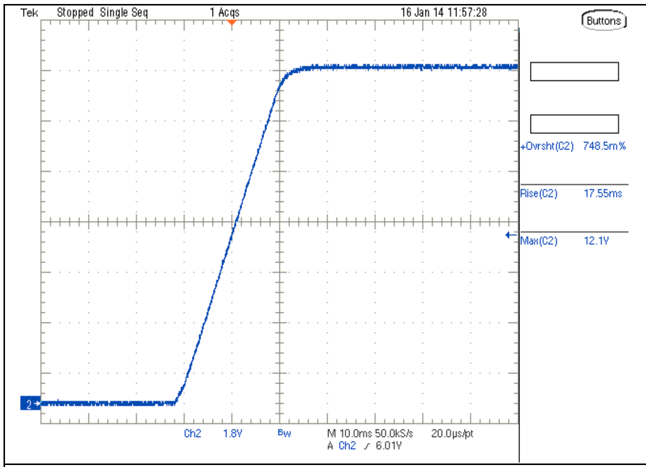
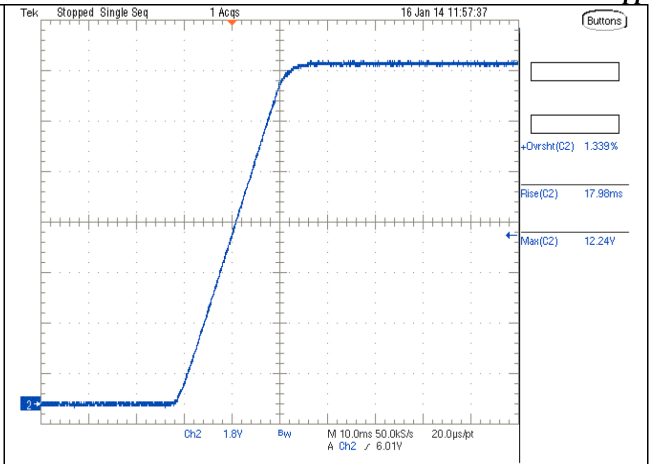
+12V rise time (T3); I/P: 100Vac,O/P:Min load ,O/P With Max Cap
CH2: +12V



+12V rise time (T3); I/P: 200Vac,O/P:Max load ,O/P With Max Cap
CH2: +12V



+12V rise time (T3); I/P: 200Vac,O/P:Min load ,O/P With Max Cap
CH2: +12V

	
+12V rise time (T3); I/P: 264Vac,O/P:Max load ,O/P With Max Cap CH2: +12V	+12V rise time (T3); I/P: 264Vac,O/P:Min load ,O/P With Max Cap CH2: +12V

3.2.7 Capacitive Loading (Tsb_on_delay)

Delay from AC being applied to 12Vsb being within regulation.

Test conditions:

Sample NO.1

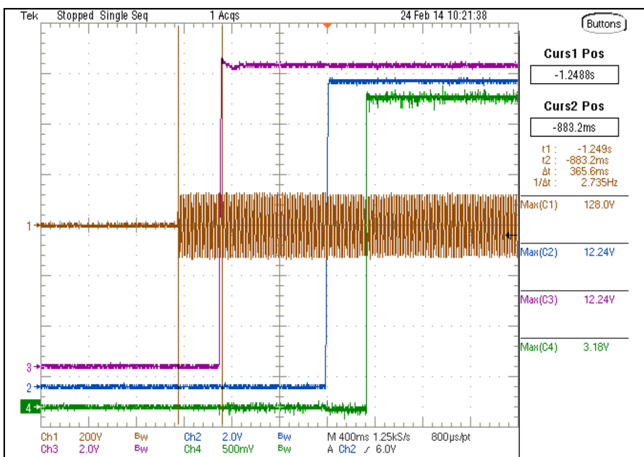
AMB. 25℃

Spec: $T_{sb\_on\_delay}$: 1500mS max

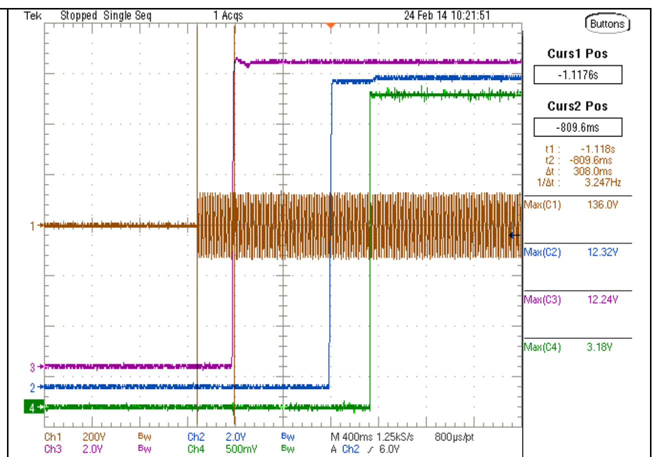
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12Vsb Start-up time (T1); I/P: 90Vac,O/P: Max load With Max Cap	1500.00	*	365.60	PASS
+12Vsb Start-up time (T1); I/P: 90Vac,O/P: Min load With Max Cap	1500.00	*	308.00	PASS
+12Vsb Start-up time (T1); I/P: 100Vac,O/P: Max load With Max Cap	1500.00	*	200.80	PASS
+12Vsb Start-up time (T1); I/P: 100Vac,O/P: Min load With Max Cap	1500.00	*	196.00	PASS
+12Vsb Start-up time (T1); I/P: 200Vac,O/P: Max load With Max Cap	1500.00	*	172.80	PASS
+12Vsb Start-up time (T1); I/P: 200Vac,O/P: Min load With Max Cap	1500.00	*	194.40	PASS
+12Vsb Start-up time (T1); I/P: 264Vac,O/P: Max load	1500.00	*	196.80	PASS
+12Vsb Start-up time (T1); I/P: 264Vac,O/P: Min load With Max Cap	1500.00	*	194.40	PASS



+12Vsb Start-up time (T1); I/P: 90Vac,O/P:
Max With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Start-up time (T1); I/P: 90Vac,O/P:
Min With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

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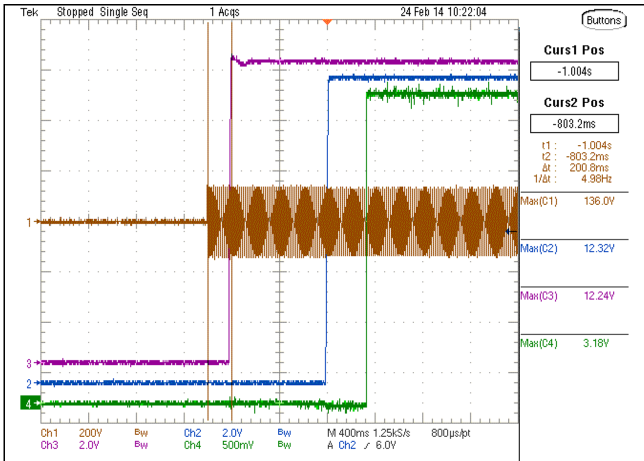
<td>
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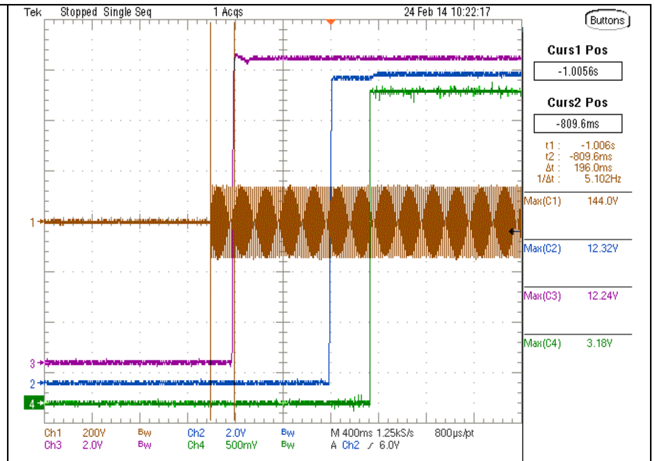
<td>
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<td>+12Vsb Start-up time (T1); I/P: 100Vac,O/P: Max With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
<td>+12Vsb Start-up time (T1); I/P: 100Vac,O/P: Min With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
</tr>
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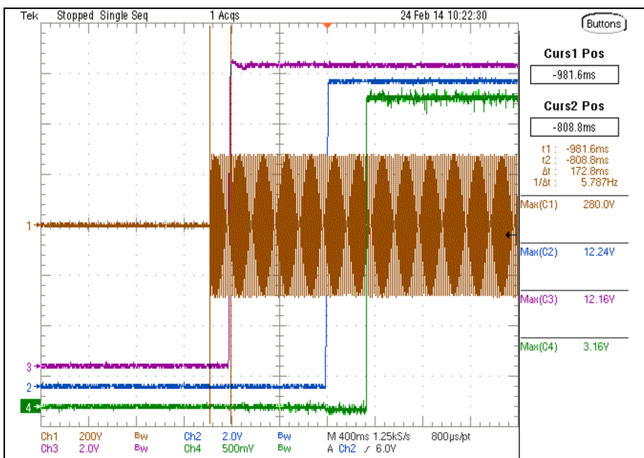
<td>
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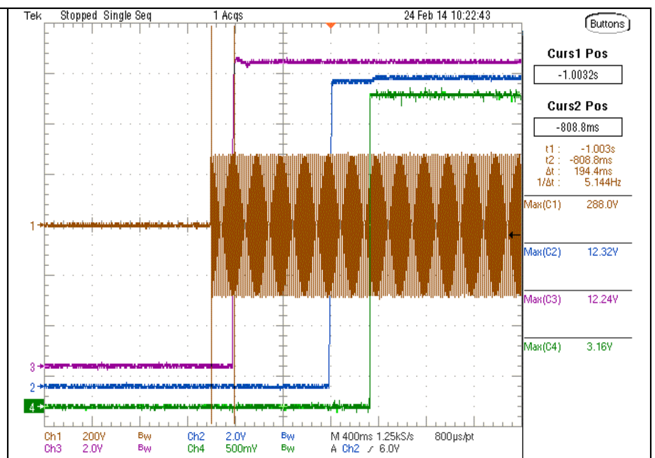
<td>
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<td>+12Vsb Start-up time (T1); I/P: 200Vac,O/P: Max With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
<td>+12Vsb Start-up time (T1); I/P: 200Vac,O/P: Min load With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
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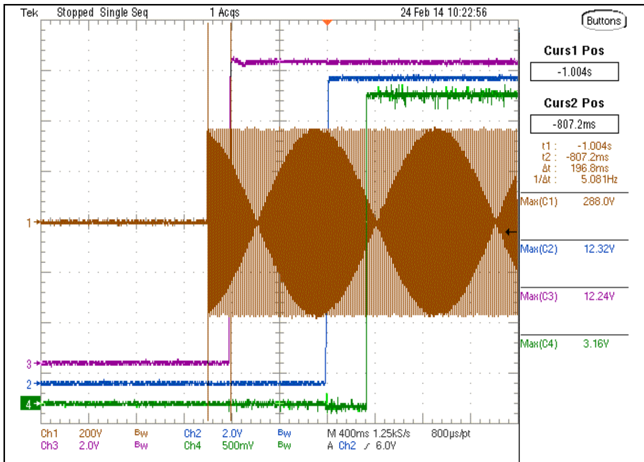
<td>
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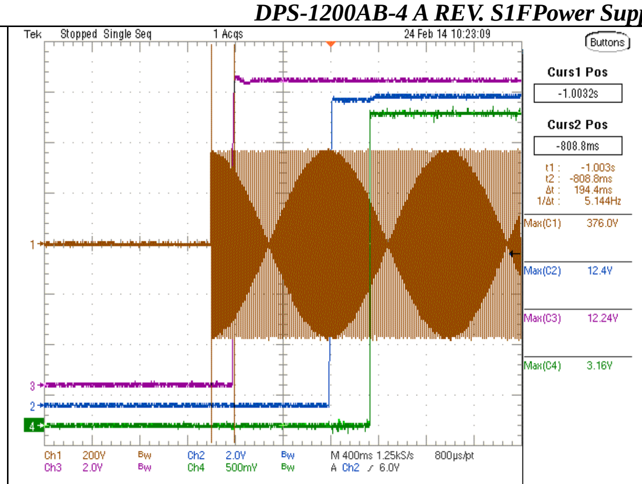
<td>
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<td>+12Vsb Start-up time (T1); I/P: 264Vac,O/P: Max load With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
<td>+12Vsb Start-up time (T1); I/P: 264Vac,O/P: Min load With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
</tr>
</table>

3.2.7 Capacitive Loading (Tac_on_delay)

Delay from AC being applied to all output voltages being within regulation.

Test conditions:

Sample NO.1

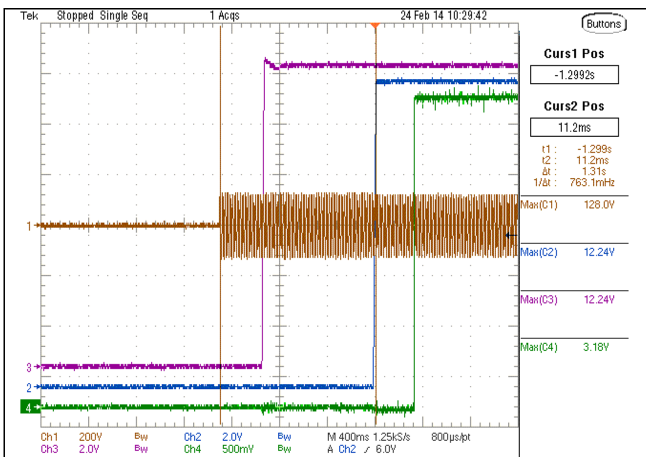
AMB. 25℃

Spec: $T_{ac\_on\_delay}$: 2500mS max.

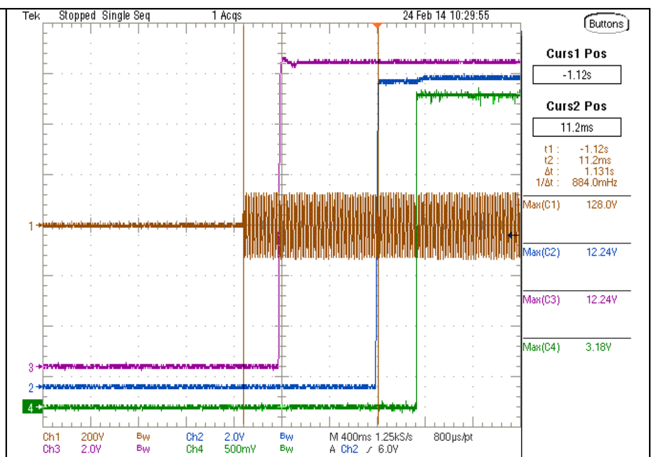
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

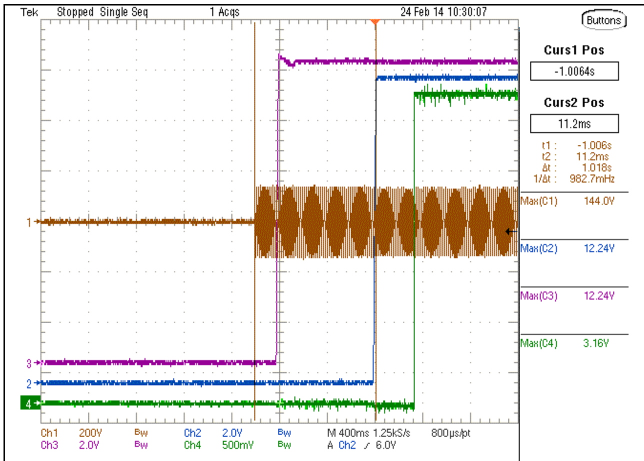
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12V Start-up time (T4); I/P: 90Vac,O/P:Max With Max Cap	2500.00	*	1310.40	PASS
+12V Start-up time (T4); I/P: 90Vac,O/P:Min With Max Cap	2500.00	*	1131.20	PASS
+12V Start-up time (T4); I/P: 100Vac,O/P:Max With Max Cap	2500.00	*	1017.60	PASS
+12V Start-up time (T4); I/P: 100Vac,O/P:Min With Max Cap	2500.00	*	1017.60	PASS
+12V Start-up time (T4); I/P: 200Vac,O/P:Max With Max Cap	2500.00	*	1002.40	PASS
+12V Start-up time (T4); I/P: 200Vac,O/P:Min With Max Cap	2500.00	*	1019.20	PASS
+12V Start-up time (T4); I/P: 264Vac,O/P:Max With Max Cap	2500.00	*	1020.00	PASS
+12V Start-up time (T4); I/P: 264Vac,O/P:Min With Max Cap	2500.00	*	1025.60	PASS



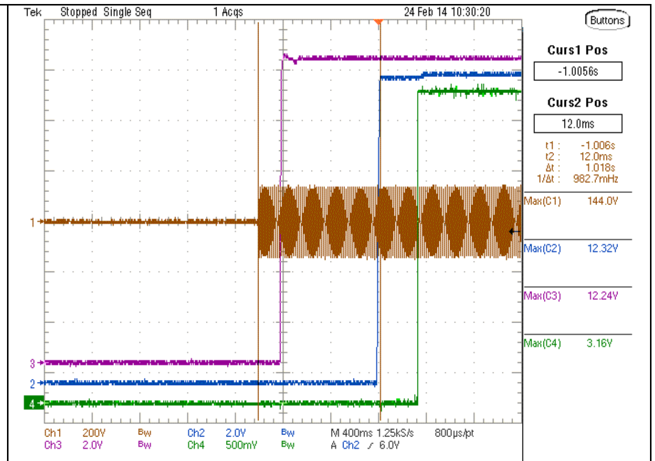
+12V Start-up time (T4); I/P: 90Vac,O/P:Max With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



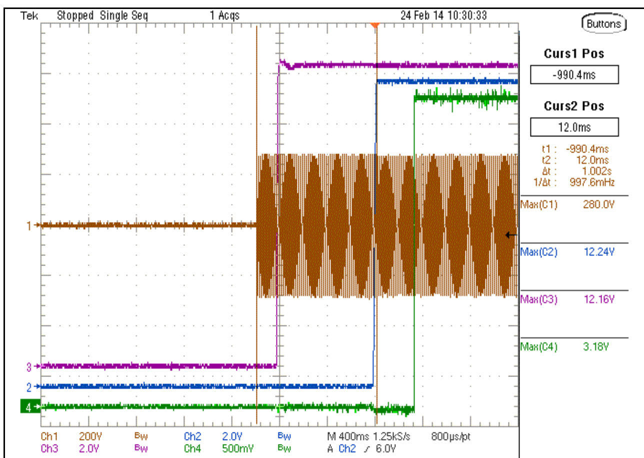
+12V Start-up time (T4); I/P: 90Vac,O/P:Min With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



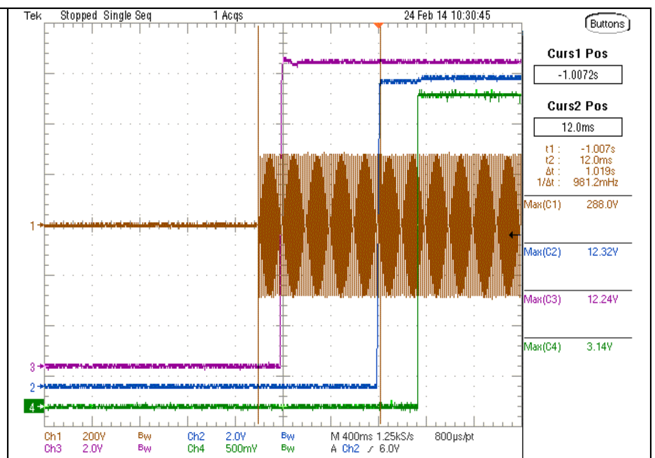
+12V Start-up time (T4); I/P: 100Vac,O/P:Max
With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



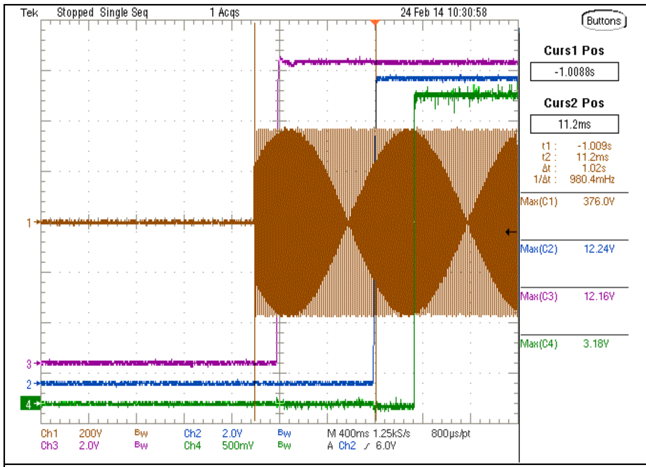
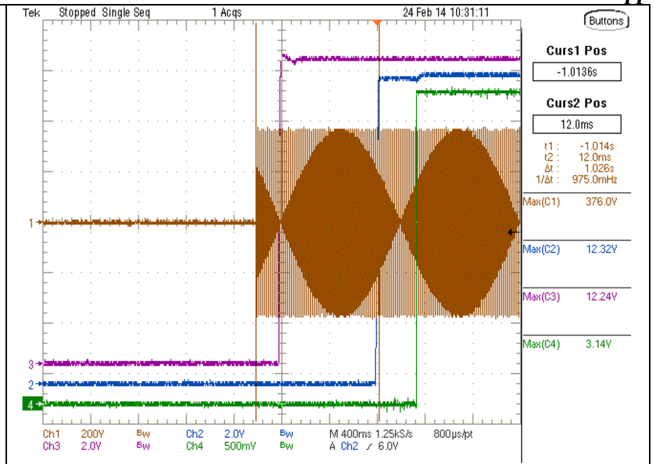
+12V Start-up time (T4); I/P: 100Vac,O/P:Min
With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12V Start-up time (T4); I/P: 200Vac,O/P:Max
With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12V Start-up time (T4); I/P: 200Vac,O/P:Min
With Max Cap
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

	
+12V Start-up time (T4); I/P: 264Vac,O/P:Max With Max Cap CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	+12V Start-up time (T4); I/P: 264Vac,O/P:Min With Max Cap CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

3.2.7 Capacitive Loading (Tpwok_on)

Delay from output voltages within regulation limits to PWOK asserted at turn on.

Test conditions:

Sample NO.1

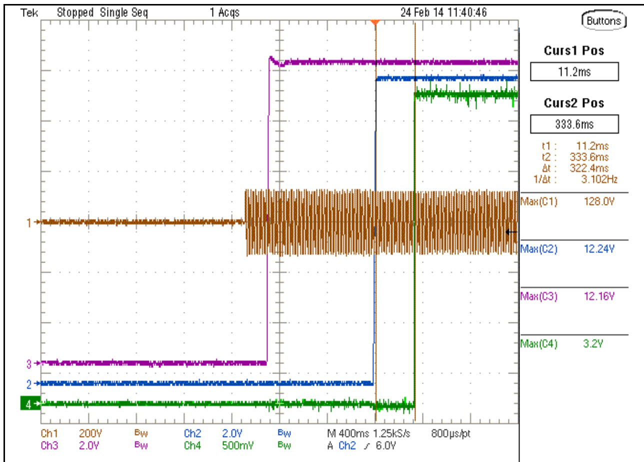
AMB. 25℃

Spec: T_{pwok_on}: 100mS ~ 500mS

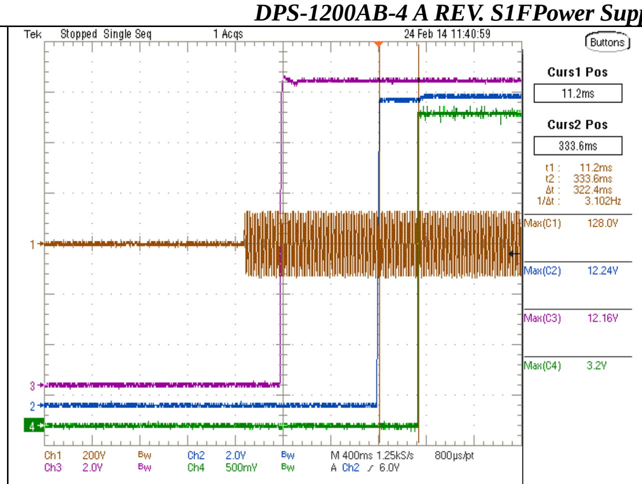
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

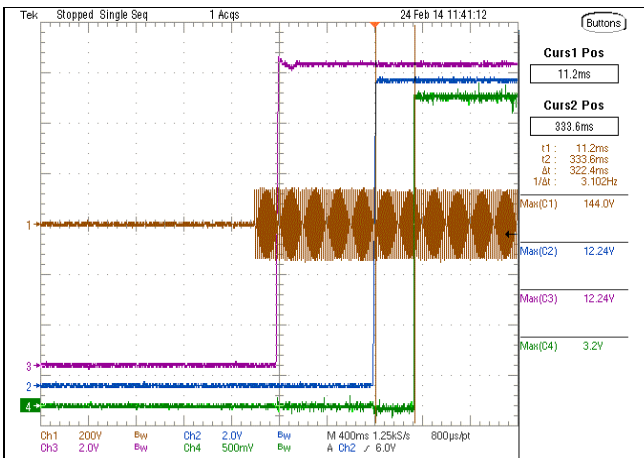
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
Start-up time (T9); I/P: 90Vac,O/P:Max load for PWOK WITH MAX CAP	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 90Vac,O/P:Min load for PWOK WITH MAX CAP WITH MAX CAP	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 100Vac,O/P:Max load for PWOK WITH MAX CAP	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 100Vac,O/P:Min load for PWOK WITH MAX CAP	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 200Vac,O/P:Max load for PWOK WITH MAX CAP	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 200Vac,O/P:Min load for PWOK WITH MAX CAP	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 264Vac,O/P:Max load for PWOK WITH MAX CAP	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 264Vac,O/P:Min load for PWOK WITH MAX CAP	500.00	100.00	322.40	PASS



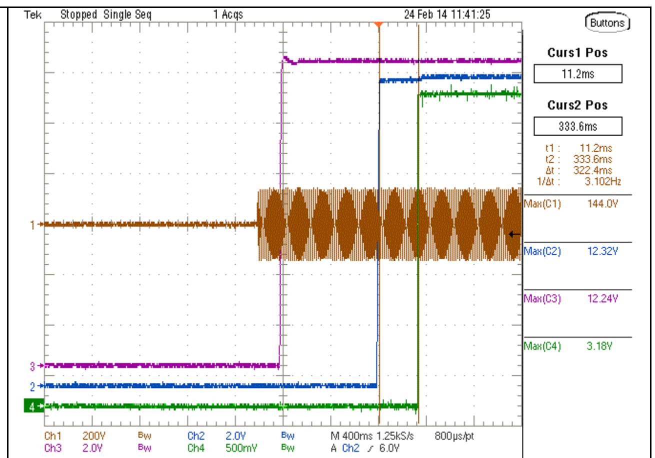
Start-up time (T9); I/P: 90Vac,O/P:Max load for PWOK WITH MAX CAP
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



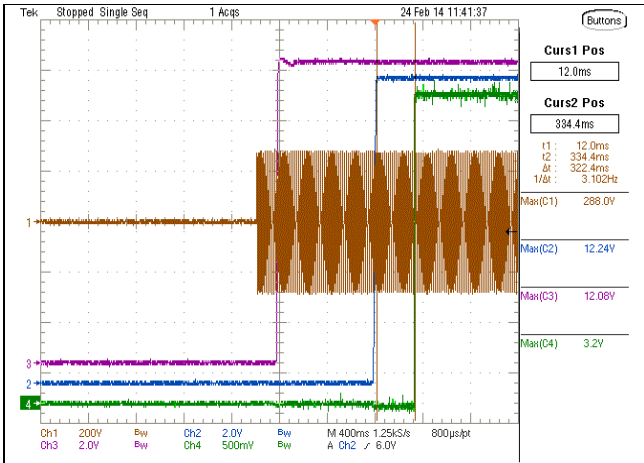
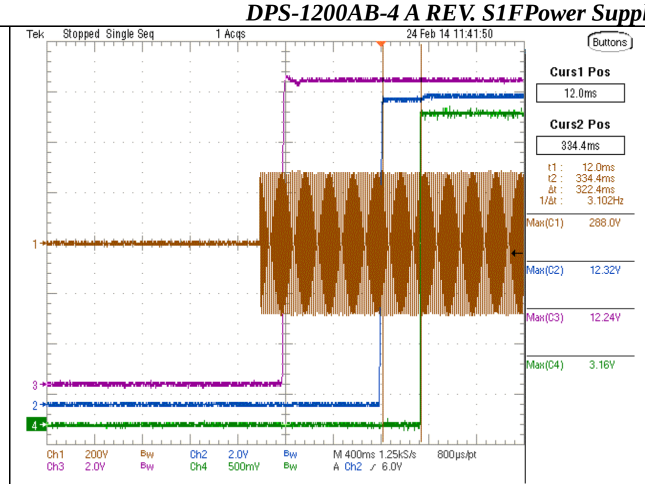
Start-up time (T9); I/P: 90Vac,O/P:Min load for PWOK WITH MAX CAP
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

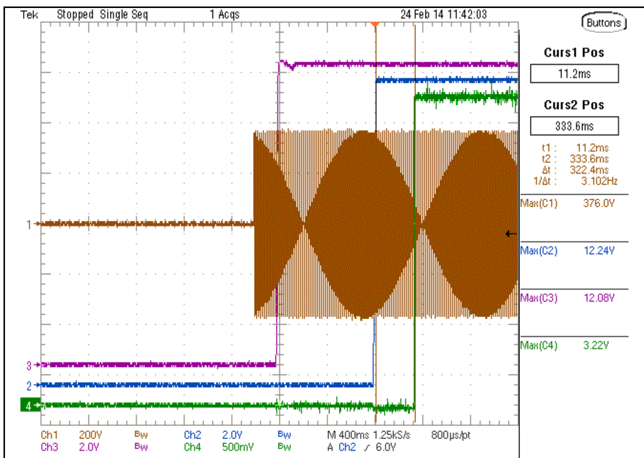
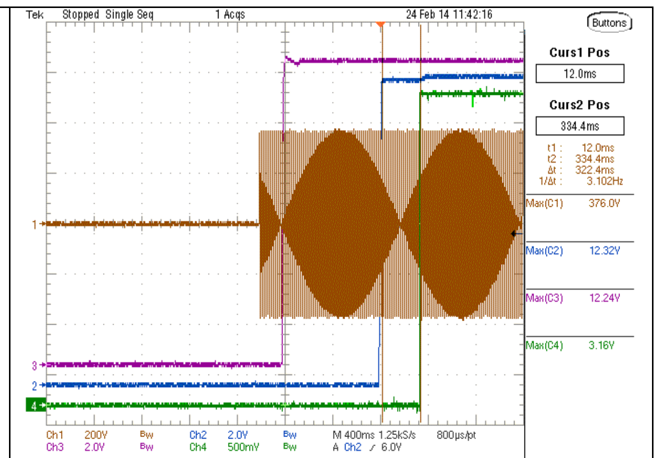


Start-up time (T9); I/P: 100Vac,O/P:Max load for PWOK WITH MAX CAP
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Start-up time (T9); I/P: 100Vac,O/P:Min load for PWOK WITH MAX CAP
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

	
Start-up time (T9); I/P: 200Vac,O/P:Max load for PWOK WITH MAX CAP CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	Start-up time (T9); I/P: 200Vac,O/P:Min load for PWOK WITH MAX CAP CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

	
Start-up time (T9); I/P: 264Vac,O/P:Max load for PWOK WITH MAX CAP CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	Start-up time (T9); I/P: 264Vac,O/P:Min load for PWOK WITH MAX CAP CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

3.2.7 Capacitive Loading (Tsb_vout)

Delay from 12Vsb being in regulation to O/Ps being in regulation at AC turn on.

Test conditions:

Sample NO.1

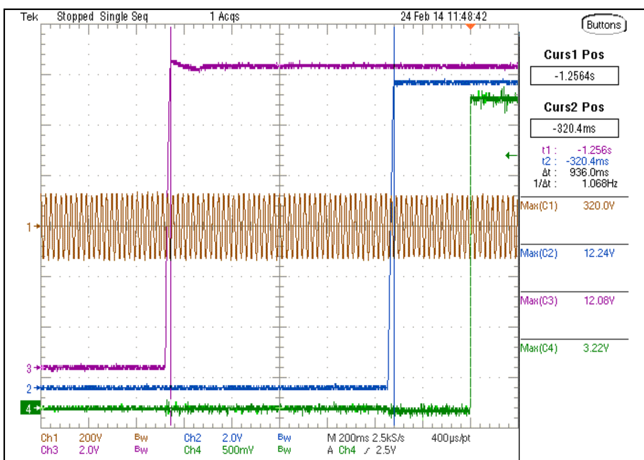
AMB. 25℃

Spec: T_{sb_vout}: 5mS ~ 1000mS

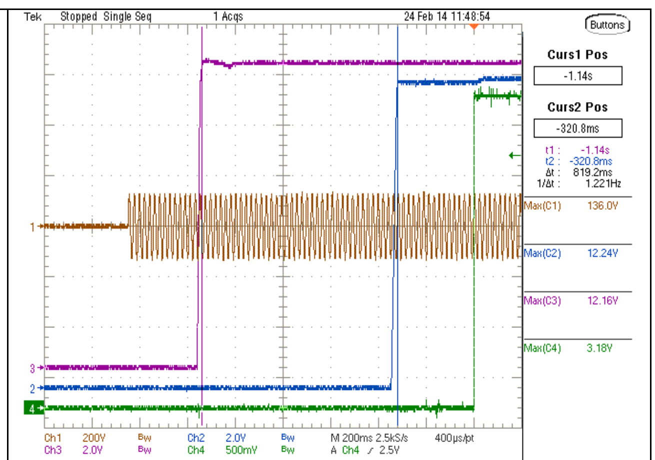
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12Vsb Power Turn on Time (T12); I/P:90Vac,O/P Max Load Max Cap.	1000.00	5.00	936.00	PASS
+12Vsb Power Turn on Time (T12); I/P:90Vac,O/P Min Load Max Cap.	1000.00	5.00	819.20	PASS
+12Vsb Power Turn on Time (T12); I/P:100Vac,O/P Max Load Max Cap.	1000.00	5.00	816.80	PASS
+12Vsb Power Turn on Time (T12); I/P:100Vac,O/P Min Load Max Cap.	1000.00	5.00	818.00	PASS
+12Vsb Power Turn on Time (T12); I/P:200Vac,O/P Max Load Max Cap.	1000.00	5.00	817.60	PASS
+12Vsb Power Turn on Time (T12); I/P:200Vac,O/P Min Load Max Cap.	1000.00	5.00	818.00	PASS
+12Vsb Power Turn on Time (T12); I/P:264Vac,O/P Max Load Max Cap.	1000.00	5.00	817.20	PASS
+12Vsb Power Turn on Time (T12); I/P:264Vac,O/P Min Load Max Cap.	1000.00	5.00	817.60	PASS

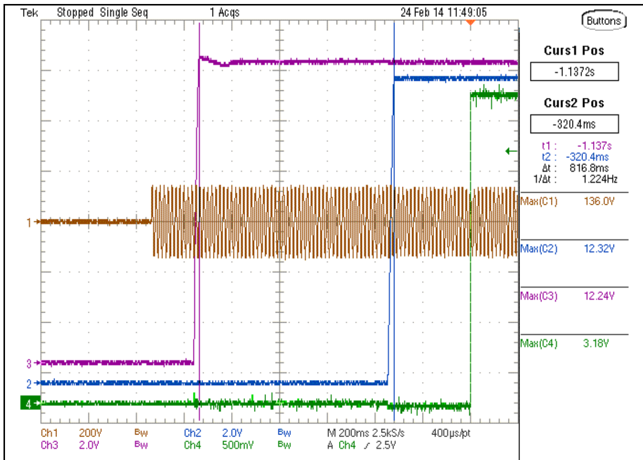


+12Vsb Power Turn on Time (T12);
I/P:90Vac,O/P Max Load Max Cap.
CH1: AC I/P
CH2: +12V
CH3: +12Vsb

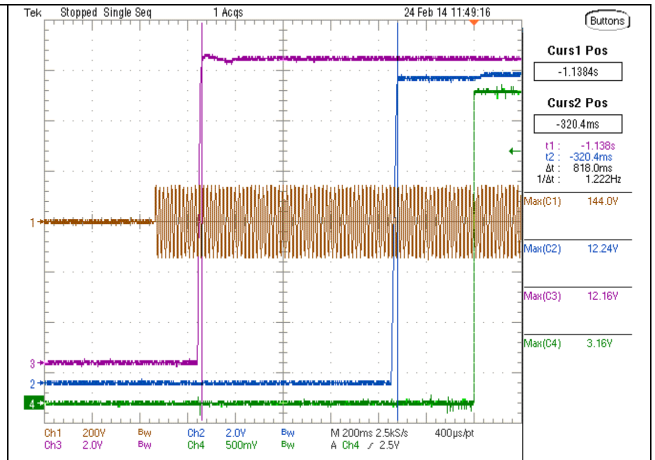


+12Vsb Power Turn on Time (T12);
I/P:90Vac,O/P Min Load Max Cap.
CH1: AC I/P
CH2: +12V
CH3: +12Vsb

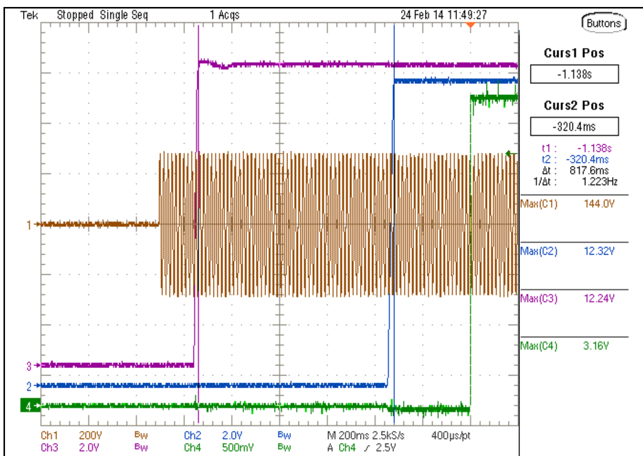
CH4: PWOK	CH4: PWOK



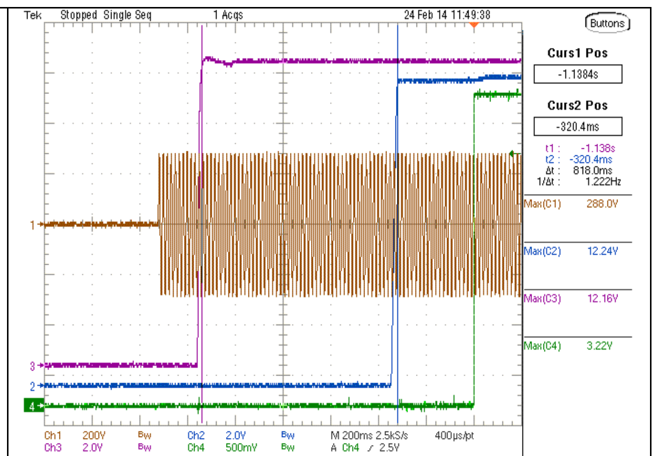
+12Vsb Power Turn on Time (T12);
I/P:100Vac,O/P Max Load Max Cap.
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



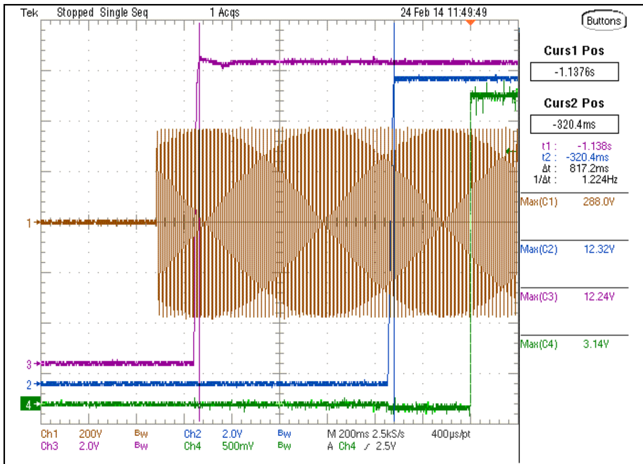
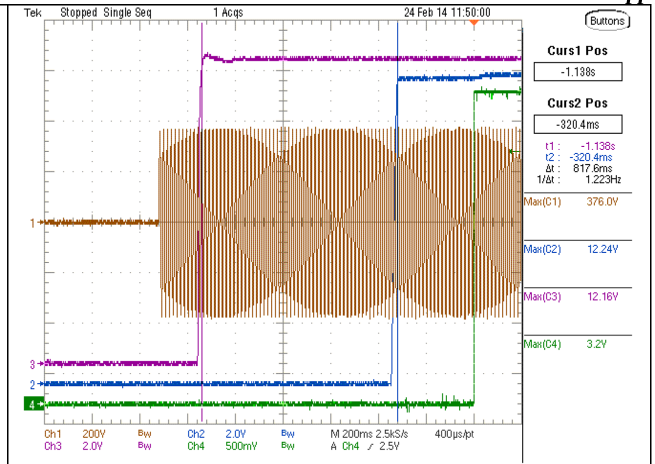
+12Vsb Power Turn on Time (T12);
I/P:100Vac,O/P Min Load Max Cap.
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Power Turn on Time (T12);
I/P:200Vac,O/P Max Load Max Cap.
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Power Turn on Time (T12);
I/P:200Vac,O/P Min Load Max Cap.
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

	
+12Vsb Power Turn on Time (T12); I/P:264Vac,O/P Max Load Max Cap. CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	+12Vsb Power Turn on Time (T12); I/P:264Vac,O/P Min Load Max Cap. CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

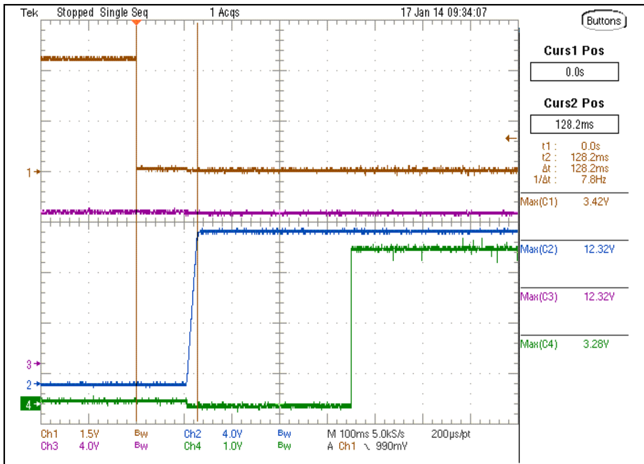
3.2.7 Capacitive Loading (Tpson_on_delay)

Delay from PSON# active to output voltages within regulation limits.

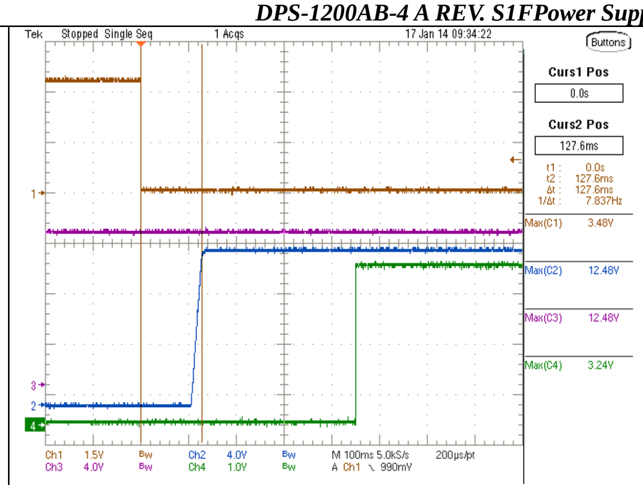
Test conditions:
Sample NO.1
AMB. 25℃
Spec: $T_{pson\_on\_delay}$: 5mS ~ 400mS
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

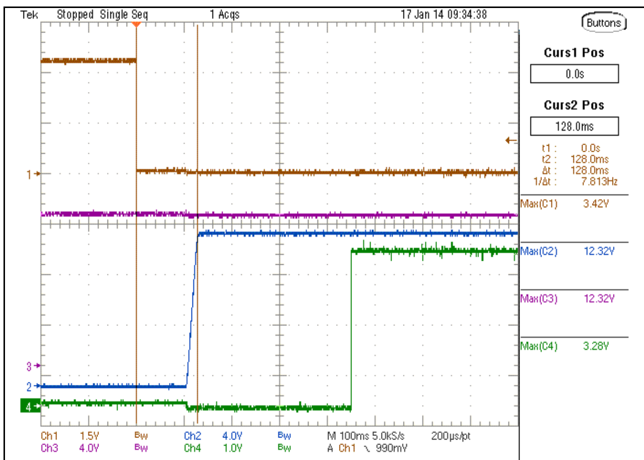
Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
Power Turn on Time (T7); I/P:90Vac,O/P:Max load ,+12V vs PSON	400.00	5.00	128.20	PASS
Power Turn on Time (T7); I/P:90Vac,O/P:Min load ,+12V vs PSON	400.00	5.00	127.60	PASS
Power Turn on Time (T7); I/P:100Vac,O/P:Max load ,+12V vs PSON	400.00	5.00	128.00	PASS
Power Turn on Time (T7); I/P:100Vac,O/P:Min load ,+12V vs PSON	400.00	5.00	128.20	PASS
Power Turn on Time (T7); I/P:200Vac,O/P:Max load ,+12V vs PSON	400.00	5.00	128.20	PASS
Power Turn on Time (T7); I/P:200Vac,O/P:Min load ,+12V vs PSON	400.00	5.00	127.80	PASS
Power Turn on Time (T7); I/P:264Vac,O/P:Max load ,+12V vs PSON	400.00	5.00	128.40	PASS
Power Turn on Time (T7); I/P:264Vac,O/P:Min load ,+12V vs PSON	400.00	5.00	127.60	PASS



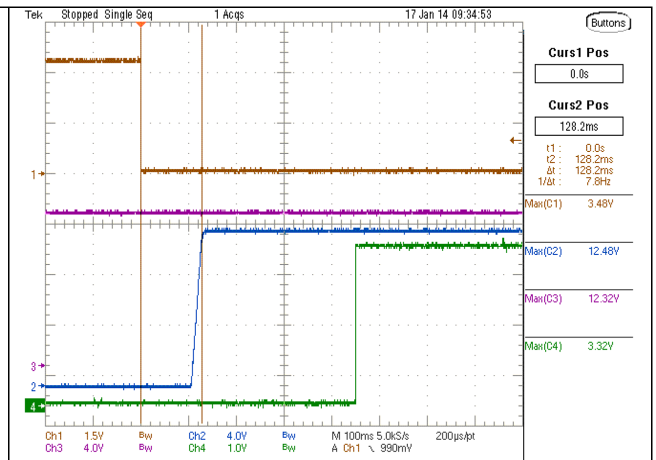
Power Turn on Time (T7); I/P:90Vac,O/P:Max load ,+12V vs PSON With Max Cap
CH1: PSON#
CH2: +12V
CH3: +12Vsb
CH4: PWOK



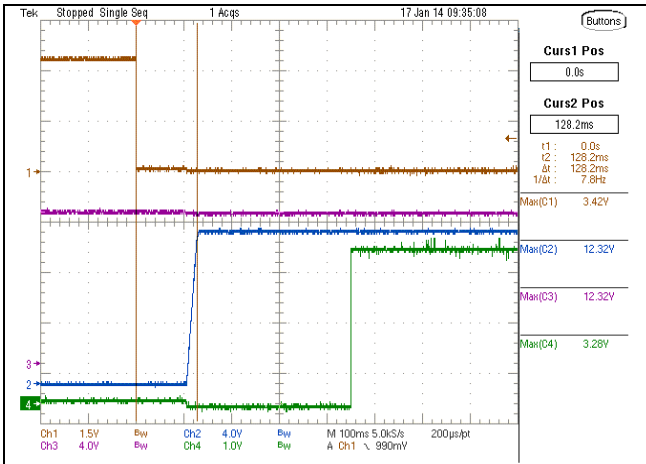
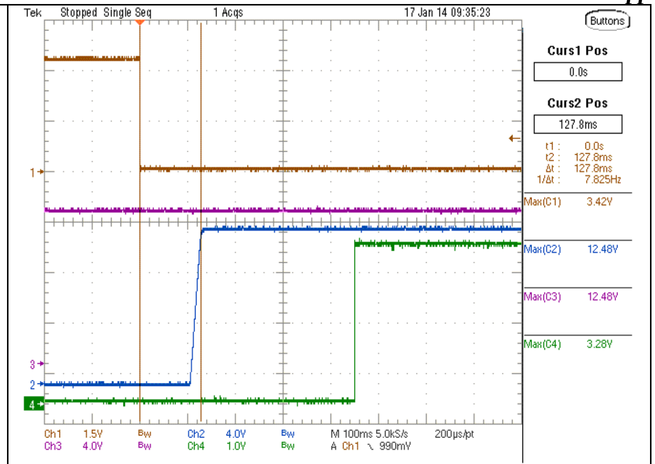
Power Turn on Time (T7); I/P:90Vac,O/P:Min load ,+12V vs PSON With Max Cap
CH1: PSON#
CH2: +12V
CH3: +12Vsb
CH4: PWOK

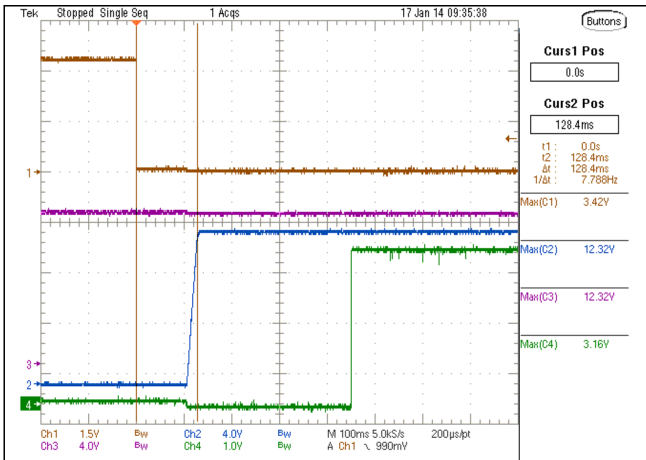
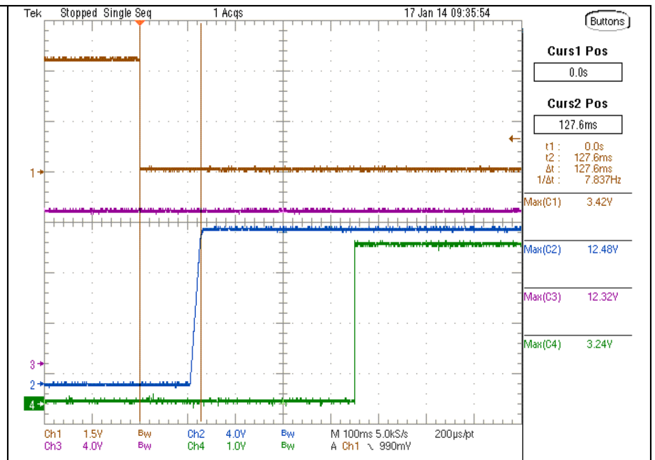


Power Turn on Time (T7); I/P:100Vac,O/P:Max load ,+12V vs PSON With Max Cap
CH1: PSON#
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Power Turn on Time (T7); I/P:100Vac,O/P:Min load ,+12V vs PSON With Max Cap
CH1: PSON#
CH2: +12V
CH3: +12Vsb
CH4: PWOK

	
Power Turn on Time (T7); I/P:200Vac,O/P:Max load ,+12V vs PSON With Max Cap CH1: PSON# CH2: +12V CH3: +12Vsb CH4: PWOK	Power Turn on Time (T7); I/P:200Vac,O/P:Min load ,+12V vs PSON With Max Cap CH1: PSON# CH2: +12V CH3: +12Vsb CH4: PWOK

	
Power Turn on Time (T7); I/P:264Vac,O/P:Max load ,+12V vs PSON With Max Cap CH3=54V , CH4=PSON	Power Turn on Time (T7); I/P:264Vac,O/P:Min load ,+12V vs PSON With Max Cap CH3=54V , CH4=PSON

3.2.8 Ripple /Noise

The maximum allowed ripple/noise output of the power supply is defined in the table below at normal temperature. This is measured over a bandwidth of 0Hz to 20MHz at the power supply output connector and the entire load range. A 10uF ceramic capacitor in parallel with a 0.1μF ceramic capacitor and minimum capacitive load (12V/1000uF, 12Vsb/100uF) are placed at the point of measurement. The ripple measured need use minimum capacitor loading at test fixture. Need test at 0deg/50deg only for reference.

Table 11: Ripple/Noise

+12V	+12VSB
120mVp-p	120mVp-p

3.2.8 Ripple /Noise

Test Condition:
Sample NO.1
Vin : 90Vac/47Hz, 264Vac/63Hz
O/P Load : Max, Min Load
AMB : 0oC, 25℃, 50oC

Numerical Result: PASS

AMB	AC Condition	O/P Load (A)		Ripple & Noise Regulation Reading (mVp-p)	
		12V	12Vsb	12V	12Vsb
25^oC	90Vac/47Hz	0.5	0.05	27	50
		0.5	2	32	100
		82	0.05	91	75
		82	2	93	100
		41	1	57	100
	264Vac/63Hz	0.5	0.05	31	50
		0.5	2	34	100
		98	0.05	108	75
		98	2	110	110
		41	1	62	75
SPEC(max)				120mVp-p	120mVp-p

※ ATS TEST
Need test at 0deg/50deg only for reference.

AMB	AC Condition	O/P Load (A)		Ripple & Noise Regulation Reading (mVp-p)	
		12V	12Vsb	12V	12Vsb
0^oC	90Vac/47Hz	0.5	0.05	41	75
		0.5	2	49	125
		82	0.05	130	50
		82	2	134	125
		41	1	86	100
	264Vac/63Hz	0.5	0.05	40	50
		0.5	2	48	125
		98	0.05	149	75
		98	2	152	125
		41	1	89	100
SPEC(max)				120mVp-p	120mVp-p

※ ATS TEST

AMB	AC Condition	O/P Load (A)		Ripple & Noise Regulation Reading (mVp-p)	
		12V	12Vsb	12V	12Vsb
$50^{o}C$	90Vac/47Hz	0.5	0.05	26	50
		0.5	2	34	100
		82	0.05	72	75
		82	2	77	100
		41	1	46	75
	264Vac/63Hz	0.5	0.05	26	50
		0.5	2	35	100
		98	0.05	86	75
		98	2	92	75
		41	1	51	75
SPEC(max)				120mVp-p	120mVp-p

※ ATS TEST

3.2.8 Ripple /Noise

Test Condition:

Sample NO.1

AMB. 25℃

Capacitive Load: +12V/1000uF, +12Vsb/100uF

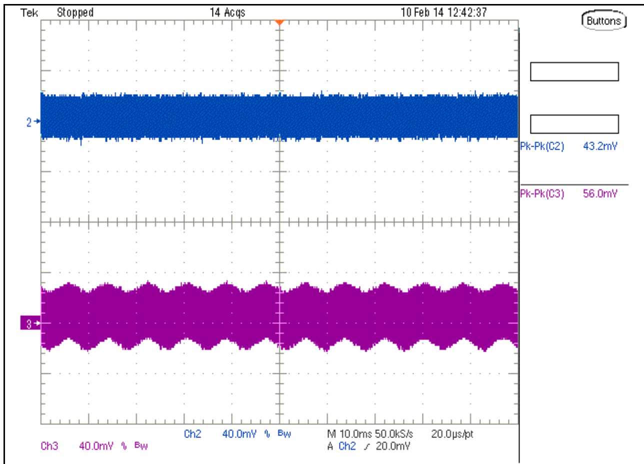
Numerical Result: PASS

※ Bench TEST

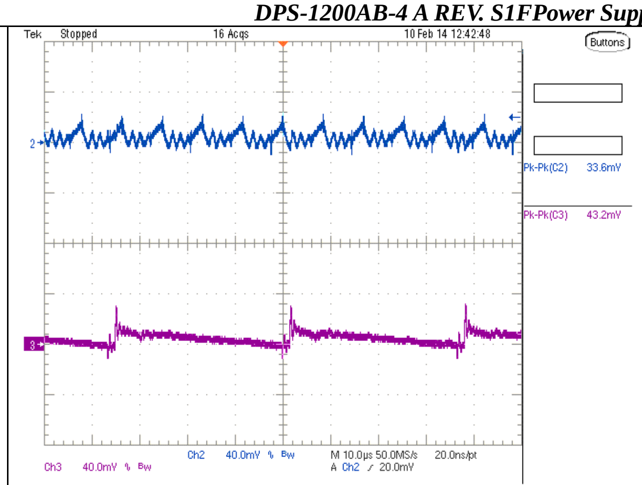
Graphical Result: PASS

Test Condition	+12V PARD (mVp-p)	+12Vsb PARD (mVp-p)	+12V PARD Reading (mVp-p)	+12Vsb PARD Reading (mVp-p)	Result
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz	120	120	43.20	56.00	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz	120	120	33.60	43.20	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: 12V_0.5A 12Vsb_2A load BW: 20MHz	120	120	51.20	99.20	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: 12V_0.5A 12Vsb_2A load BW: 20MHz	120	120	36.80	91.20	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: 50% load BW: 20MHz	120	120	70.40	91.20	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: 50% load BW: 20MHz	120	120	54.40	80.00	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz	120	120	105.60	112.00	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz	120	120	92.80	94.40	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Standby mode Min Load BW: 20MHz	120	120	20.80	67.20	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Standby mode Min Load BW: 20MHz	120	120	13.60	43.20	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Standby mode Max Load BW: 20MHz	120	120	20.00	100.80	PASS
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Standby mode Max Load BW: 20MHz	120	120	12.80	92.80	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Standby mode Min Load BW: 20MHz	120	120	20.00	67.20	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Standby mode Min Load BW: 20MHz	120	120	8.00	46.40	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Standby mode Max Load BW: 20MHz	120	120	20.80	104.00	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Standby mode Max Load BW: 20MHz	120	120	7.20	91.20	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz	120	120	41.60	56.00	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz	120	120	35.20	44.80	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 12V_36.5A 12Vsb_0.05A loadBW: 20MHz	120	120	65.60	59.20	PASS

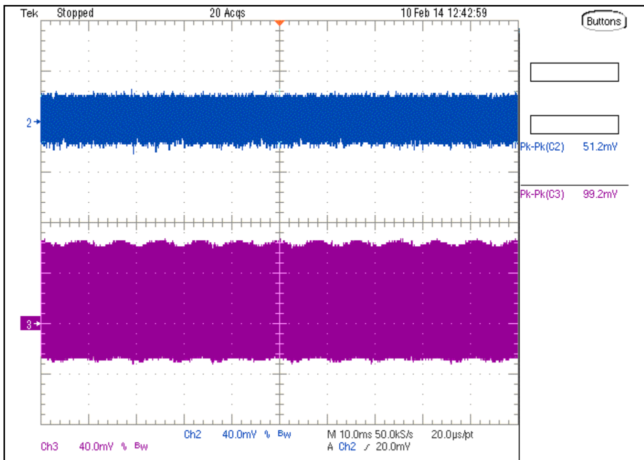
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 12V_36.5A 12Vsb_0.05A load BW: 20MHz	120	120	54.40	46.40	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 12V_82A 12Vsb_0.05A oad BW: 20MHz	120	120	100.80	64.00	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 12V_82A 12Vsb_0.05A load BW: 20MHz	120	120	84.80	48.00	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 50% load BW: 20MHz	120	120	72.00	88.00	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 50% load BW: 20MHz	120	120	57.60	80.00	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz	120	120	105.60	110.40	PASS
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz	120	120	89.60	96.00	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz	120	120	41.60	56.00	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz	120	120	40.00	43.20	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_0.5A 12Vsb_2A load BW: 20MHz	120	120	107.20	108.80	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_0.5A 12Vsb_2A load BW: 20MHz	120	120	89.60	96.00	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_49A 12Vsb_0.05A load BW: 20MHz	120	120	46.40	97.60	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_49A 12Vsb_0.05A load BW: 20MHz	120	120	40.00	89.60	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_98A 12Vsb_0.05A load BW: 20MHz	120	120	113.60	65.60	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_98A 12Vsb_0.05A load BW: 20MHz	120	120	104.00	51.20	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 50% load BW: 20MHz	120	120	76.80	91.20	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 50% load BW: 20MHz	120	120	59.20	80.00	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz	120	120	120.00	113.60	PASS
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz	120	120	100.80	96.00	PASS



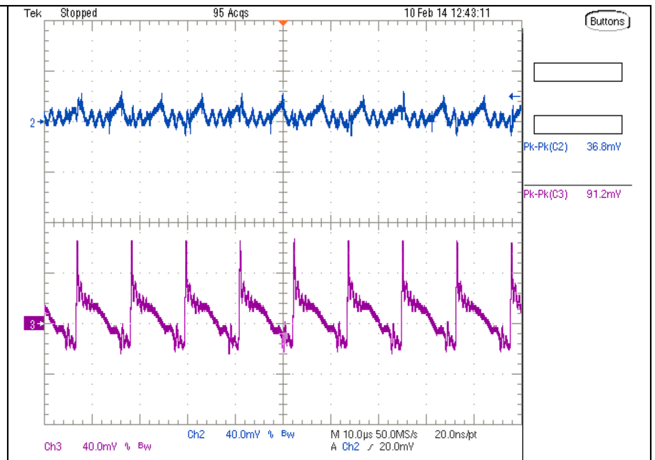
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz
CH2: +12V
CH3: +12Vsb



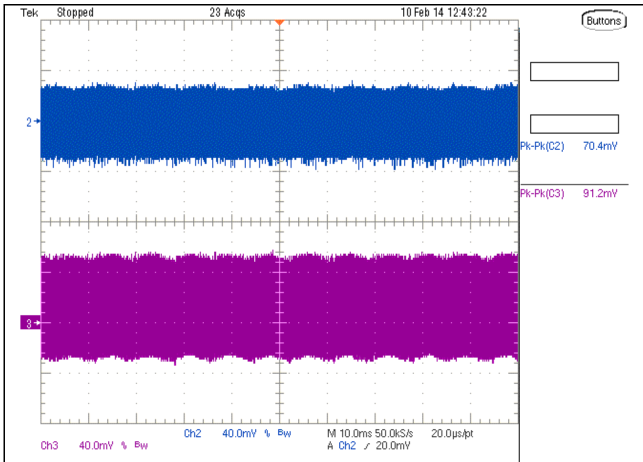
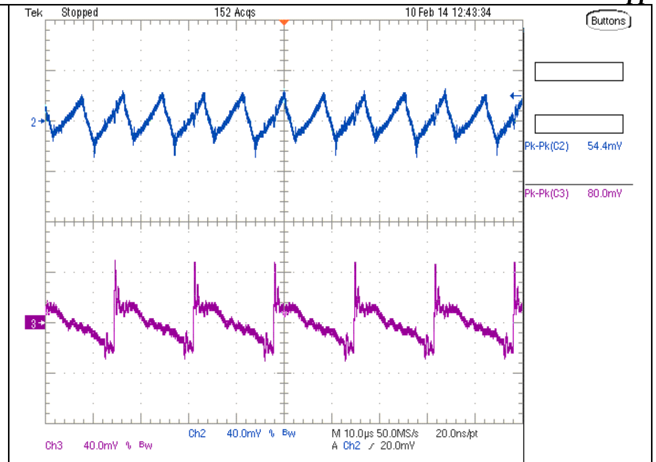
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz
CH2: +12V
CH3: +12Vsb

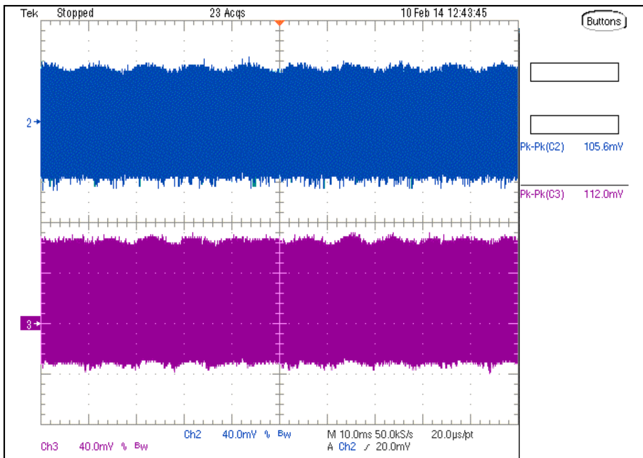
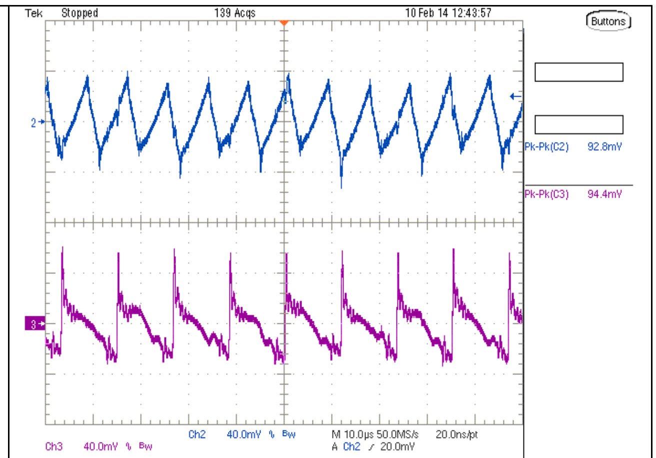


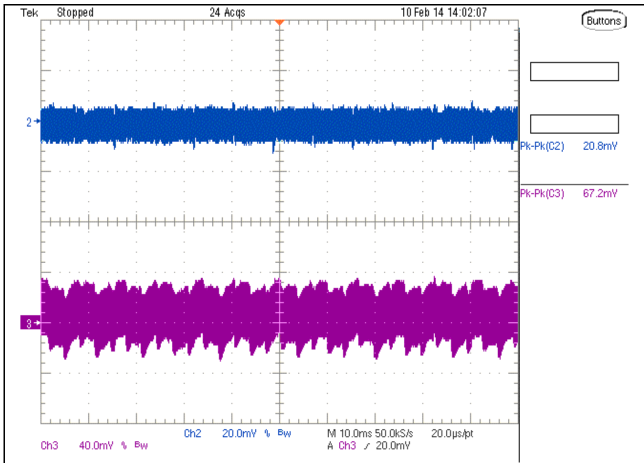
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: 12V_0.5A 12Vsb_2A load BW: 20MHz
CH2: +12V
CH3: +12Vsb



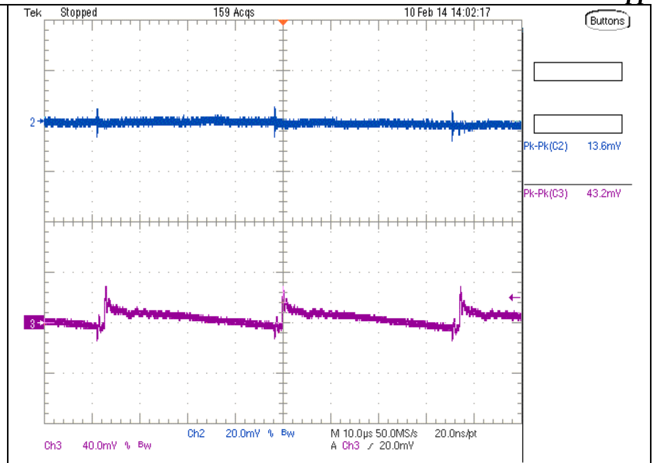
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: 12V_0.5A 12Vsb_2A load BW: 20MHz
CH2: +12V
CH3: +12Vsb

	
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: 50% load BW: 20MHz CH2: +12V CH3: +12Vsb	+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: 50% load BW: 20MHz CH2: +12V CH3: +12Vsb

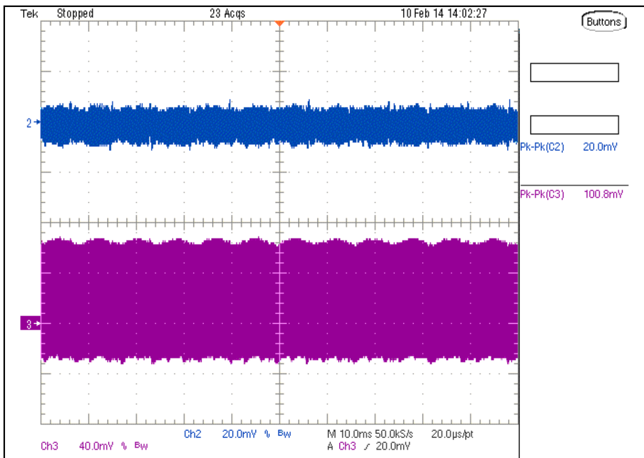
	
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz CH2: +12V CH3: +12Vsb	+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz CH2: +12V CH3: +12Vsb



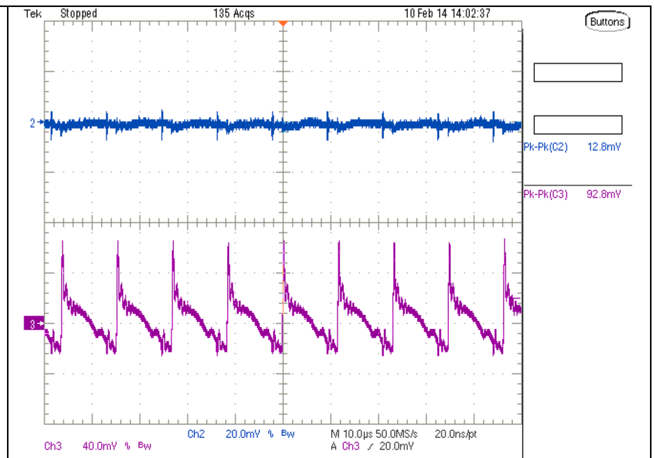
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Standby mode Min Load
BW: 20MHz
CH2: +12V
CH3: +12Vsb



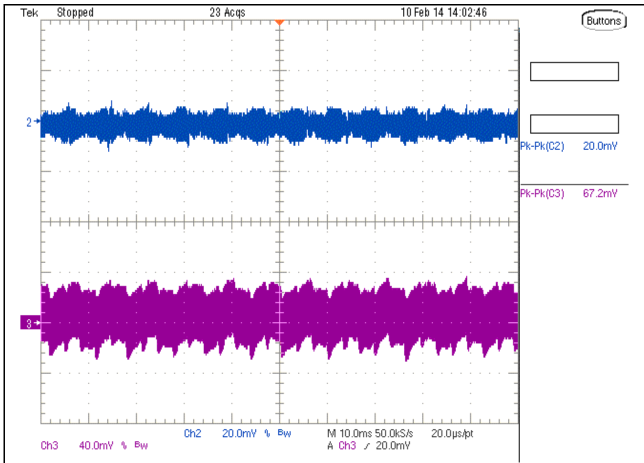
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Standby mode Min Load
BW: 20MHz
CH2: +12V
CH3: +12Vsb



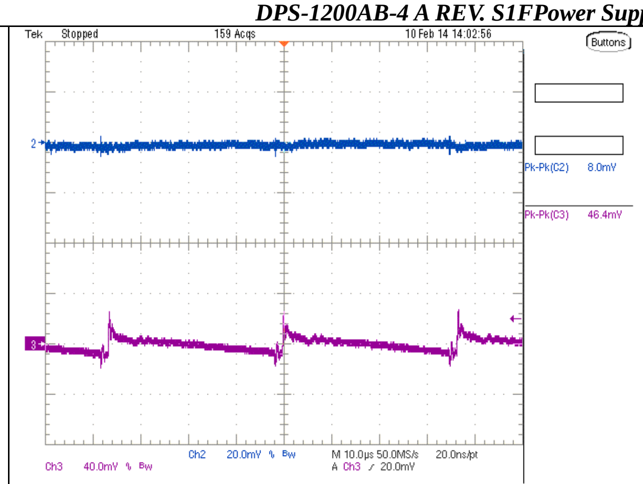
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Standby mode Max Load
BW: 20MHz
CH2: +12V
CH3: +12Vsb



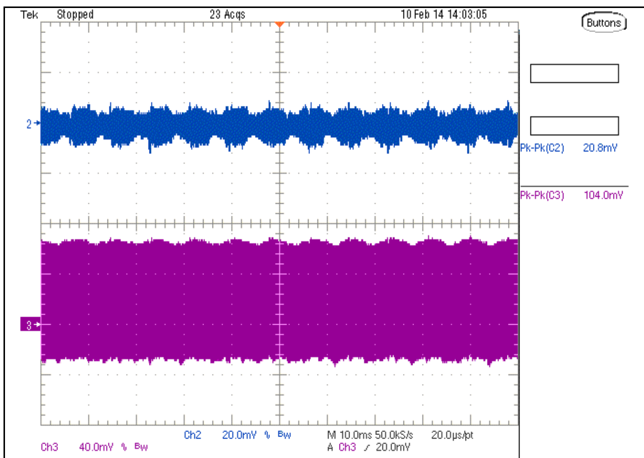
+12V and +12Vsb PARD; I/P: 90Vac/47Hz,O/P: Standby mode Max Load
BW: 20MHz
CH2: +12V
CH3: +12Vsb



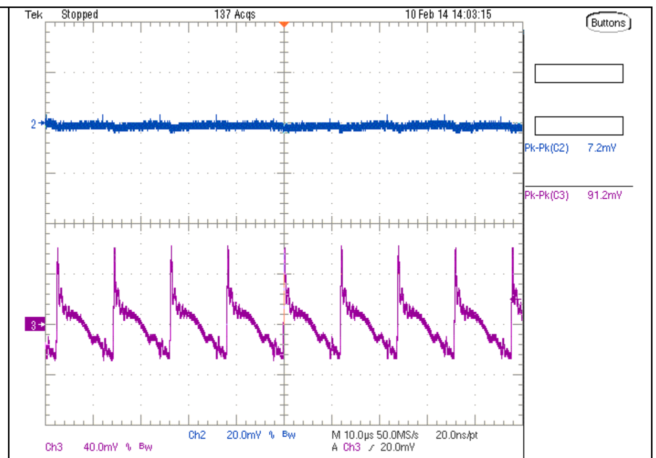
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Standby mode Min Load
BW: 20MHz
CH2: +12V
CH3: +12Vsb



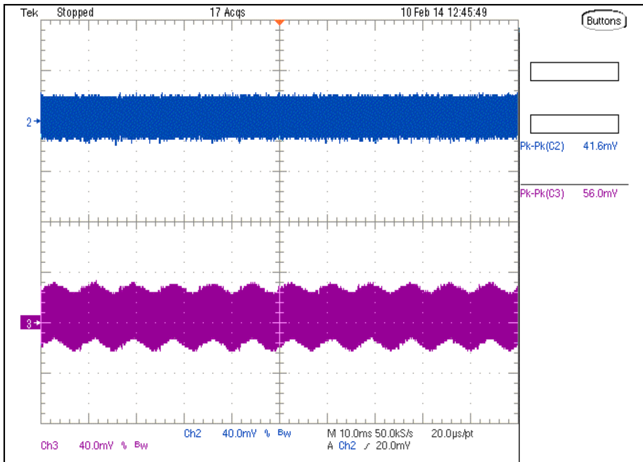
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Standby mode Min Load
BW: 20MHz
CH2: +12V
CH3: +12Vsb



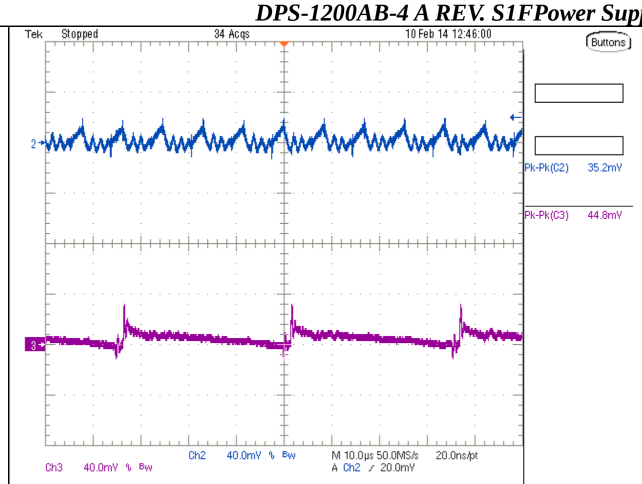
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Standby mode Max Load
BW: 20MHz
CH2: +12V
CH3: +12Vsb



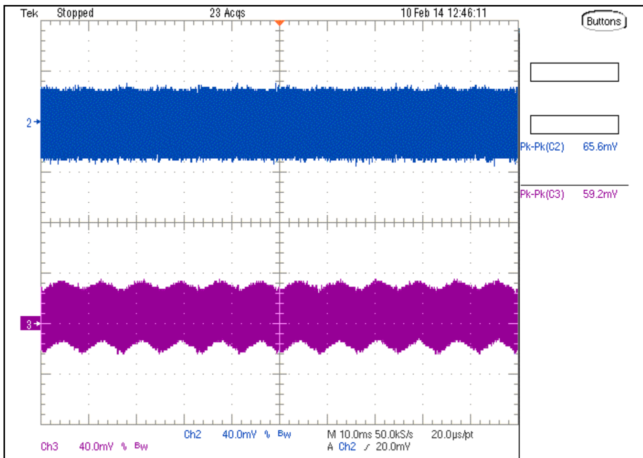
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Standby mode Max Load
BW: 20MHz
CH2: +12V
CH3: +12Vsb



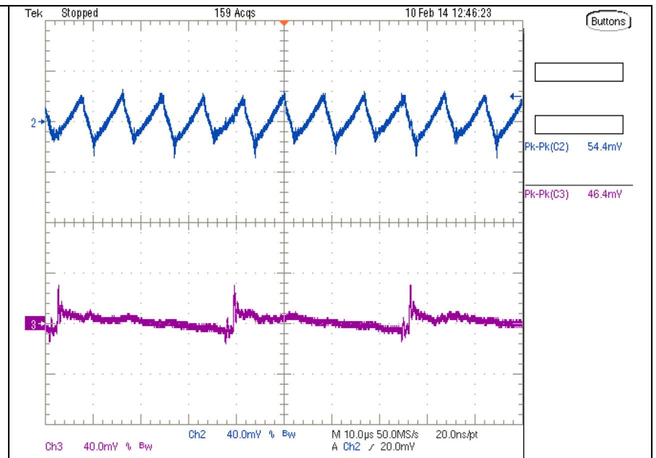
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz
CH2: +12V
CH3: +12Vsb



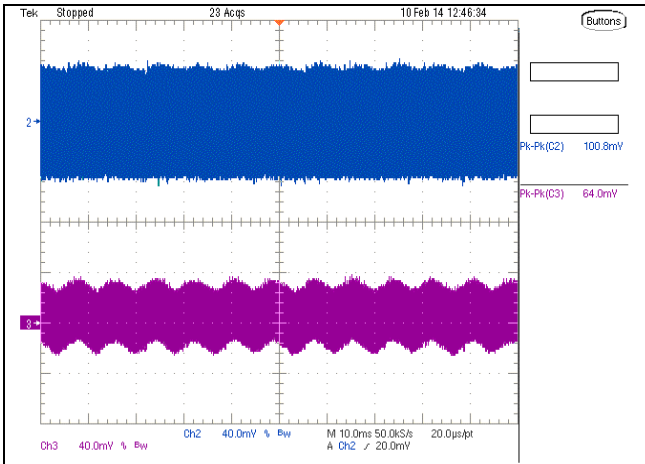
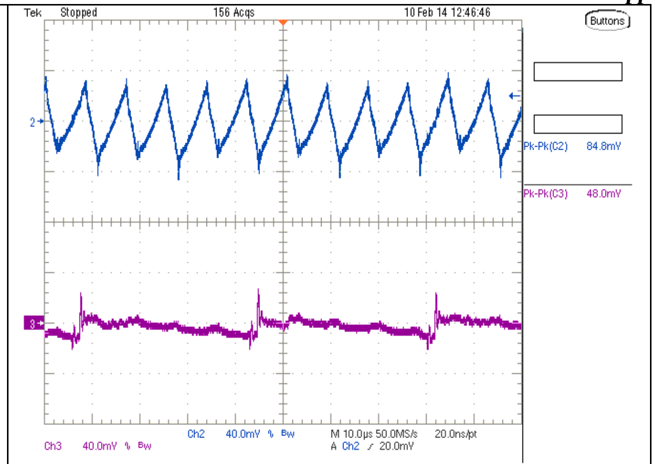
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz
CH2: +12V
CH3: +12Vsb

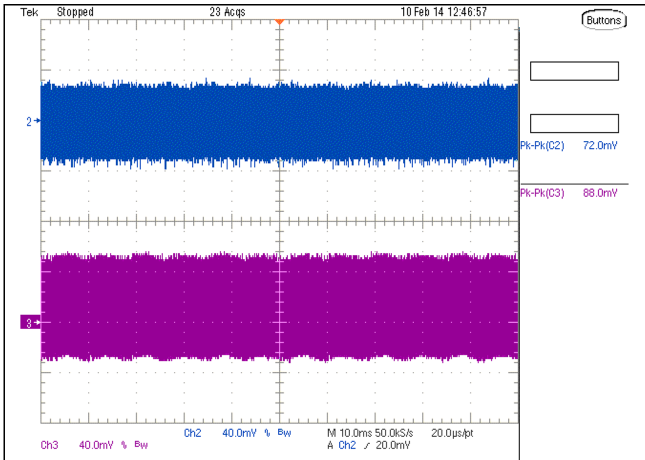
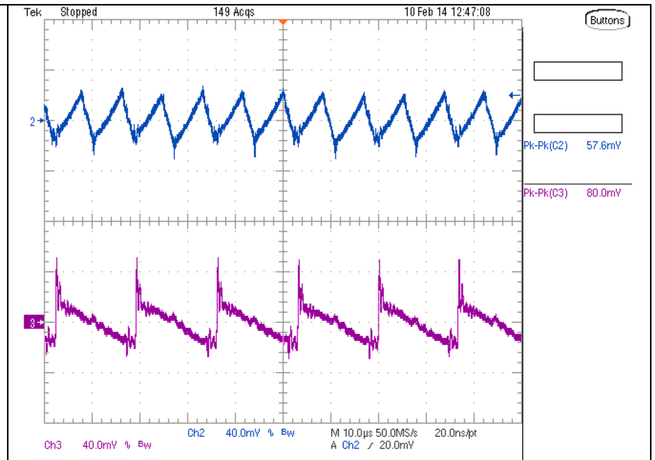


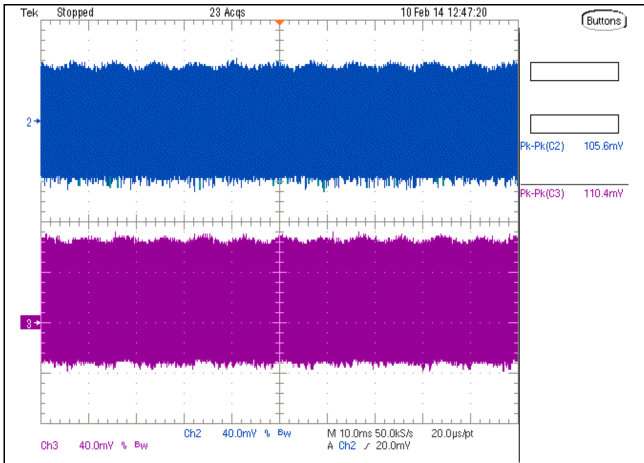
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 12V_36.5A 12Vsb_0.05A loadBW: 20MHz
CH2: +12V
CH3: +12Vsb



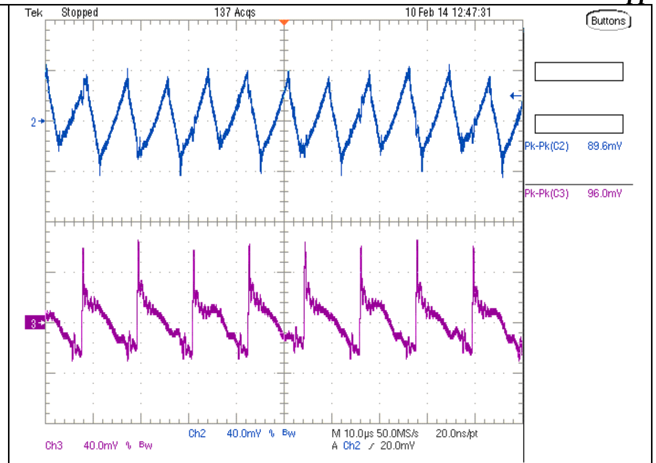
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 12V_36.5A 12Vsb_0.05A load BW: 20MHz
CH2: +12V
CH3: +12Vsb

	
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 12V_82A 12Vsb_0.05A oad BW: 20MHz CH2: +12V CH3: +12Vsb	+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 12V_82A 12Vsb_0.05A load BW: 20MHz CH2: +12V CH3: +12Vsb

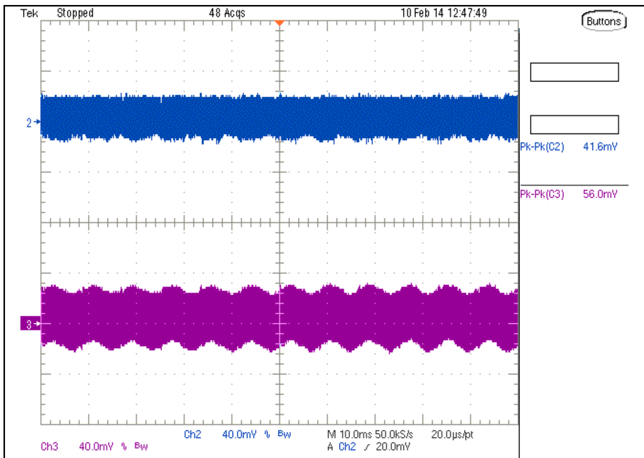
	
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 50% load BW: 20MHz CH2: +12V CH3: +12Vsb	+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: 50% load BW: 20MHz CH2: +12V CH3: +12Vsb



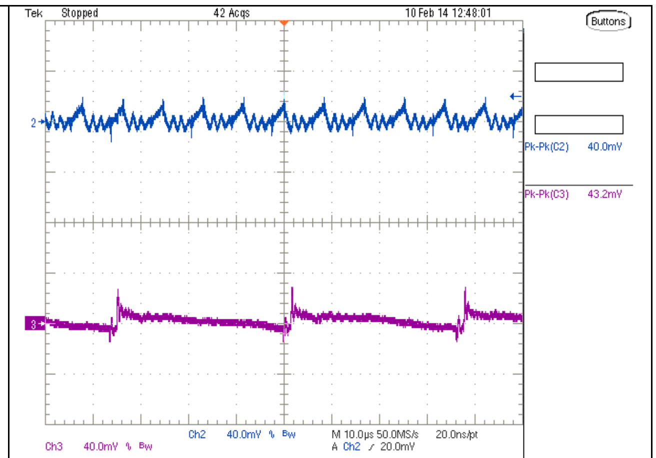
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz
CH2: +12V
CH3: +12Vsb



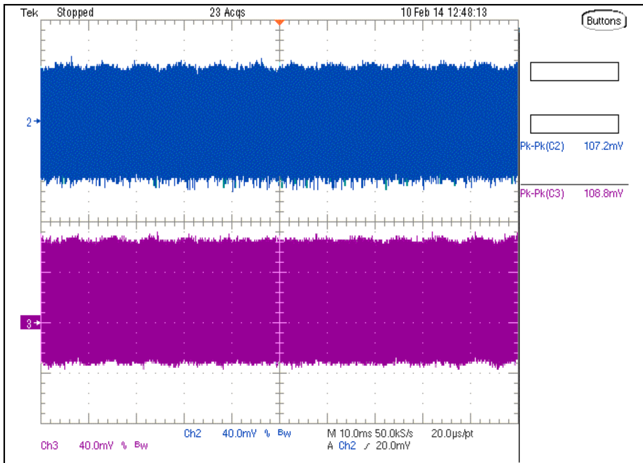
+12V and +12Vsb PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz
CH2: +12V
CH3: +12Vsb



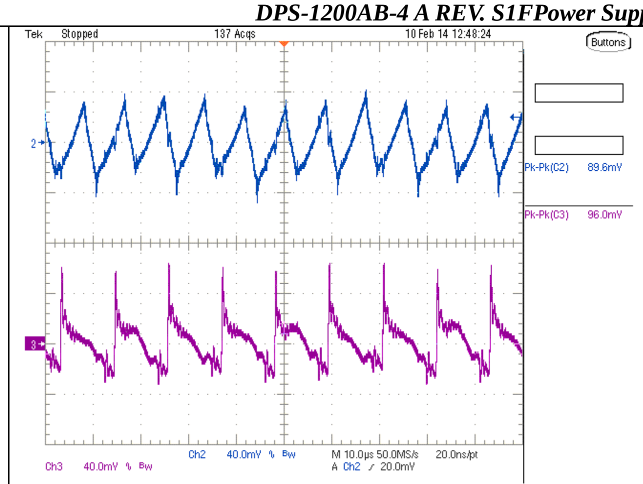
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz
CH2: +12V
CH3: +12Vsb



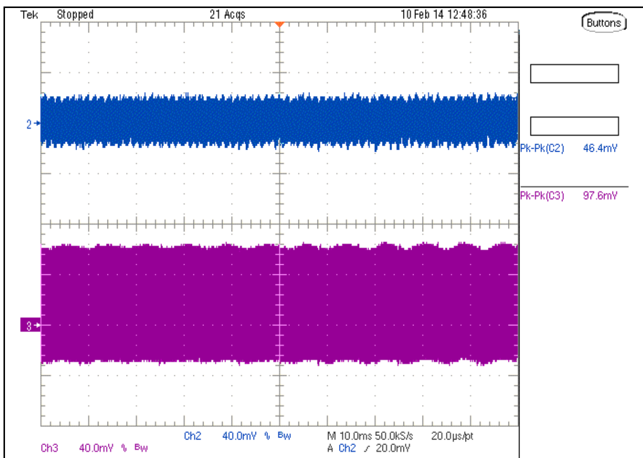
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz
CH2: +12V
CH3: +12Vsb



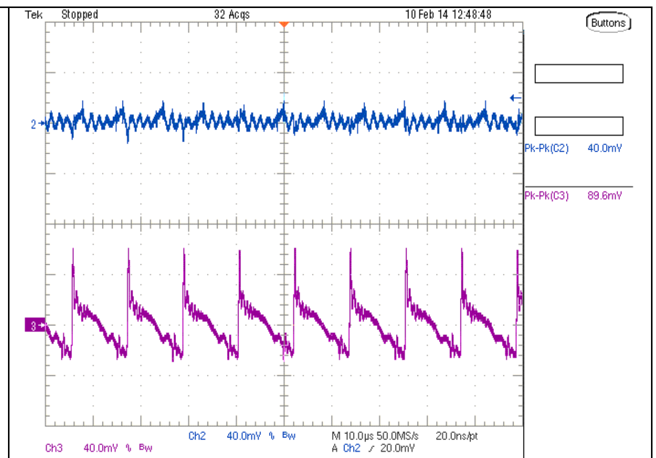
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_0.5A 12Vsb_2A load BW: 20MHz
CH2: +12V
CH3: +12Vsb



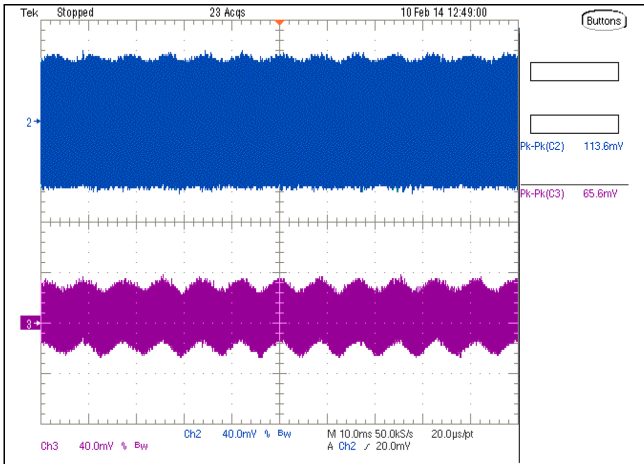
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_0.5A 12Vsb_2A load BW: 20MHz
CH2: +12V
CH3: +12Vsb



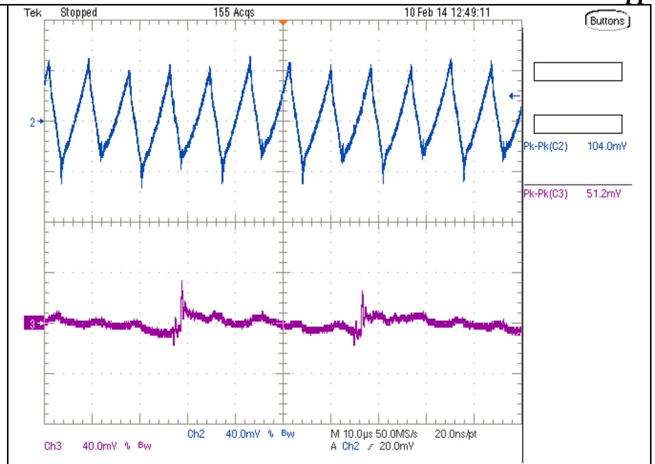
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_49A 12Vsb_0.05A load BW: 20MHz
CH2: +12V
CH3: +12Vsb



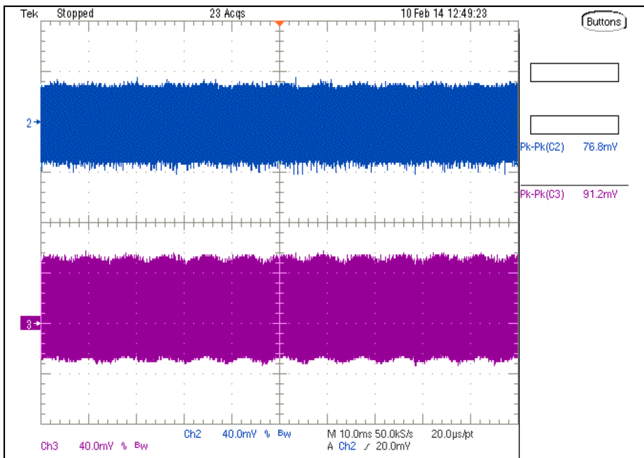
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_49A 12Vsb_0.05A load BW: 20MHz
CH2: +12V
CH3: +12Vsb



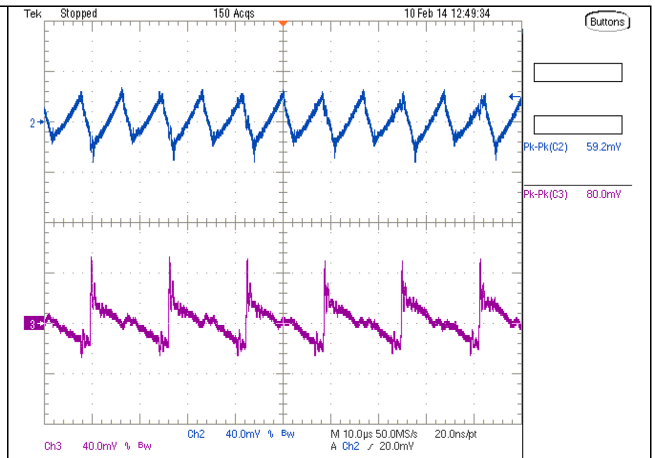
+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_98A 12Vsb_0.05A load BW: 20MHz
CH2: +12V
CH3: +12Vsb



+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 12V_98A 12Vsb_0.05A load BW: 20MHz
CH2: +12V
CH3: +12Vsb



+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 50% load BW: 20MHz
CH2: +12V
CH3: +12Vsb



+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: 50% load BW: 20MHz
CH2: +12V
CH3: +12Vsb

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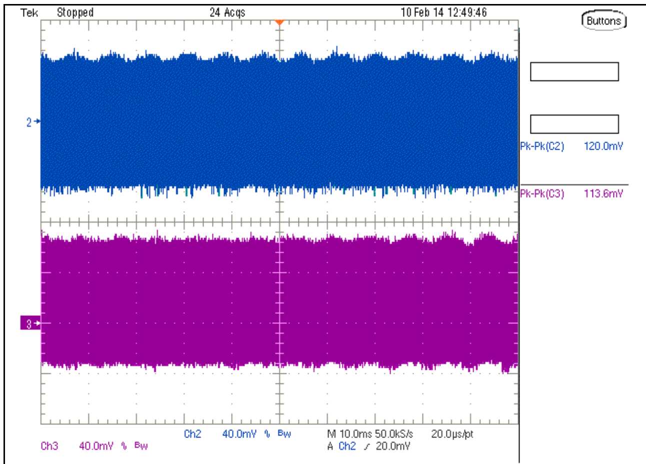
<td>
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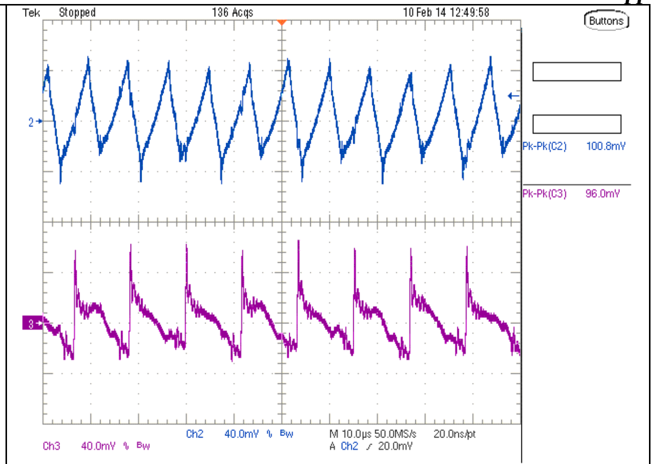
<td>
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<td>+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz
CH2: +12V
CH3: +12Vsb</td>
<td>+12V and +12Vsb PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz
CH2: +12V
CH3: +12Vsb</td>
</tr>
</table>

3.2.13 Common Mode Noise

The Common Mode noise on any output shall not exceed 350mV pk-pk over the frequency band of 10Hz to 20MHz.

1. The measurement shall be made across a 100Ω resistor between each of DC outputs, including ground at the DC power connector and chassis ground (power subsystem enclosure).
2. The test set-up shall use a FET probe such as Tektronix model P6046 or equivalent.

Test conditions:

Sample NO.1

AMB. 25℃

Test1: 90VAC

Test2: 180VAC

Load: Dummy Load

Graphical Result: N/T

3.2.14 Soft Starting

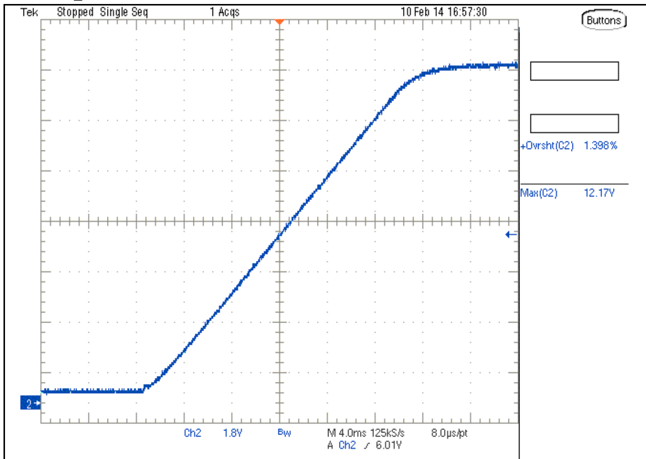
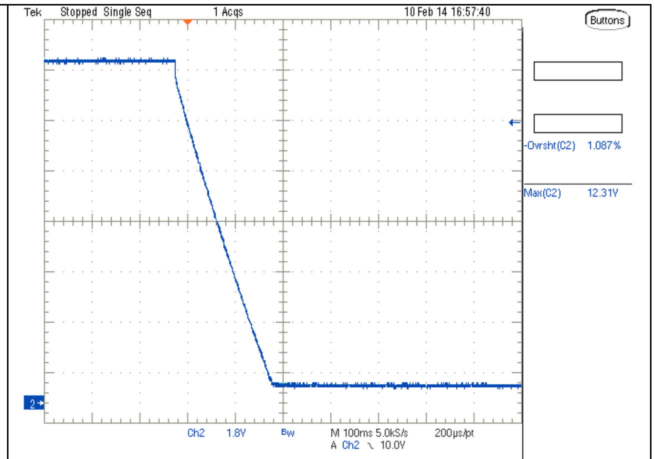
The Power Supply shall contain control circuit which provides monotonic soft start for its outputs without overstress of the AC line or any power supply components at any specified AC line or load conditions.

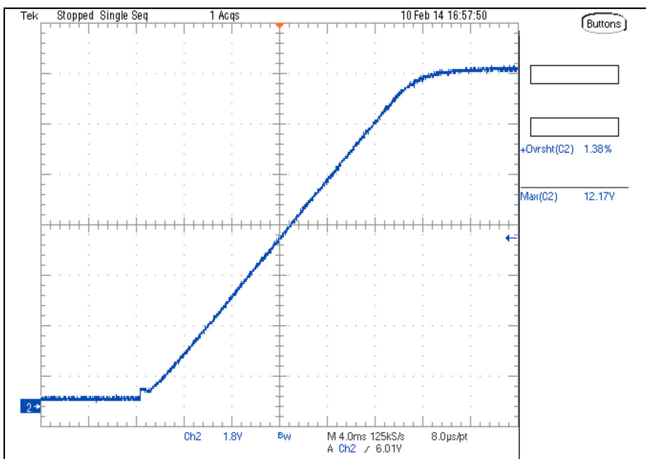
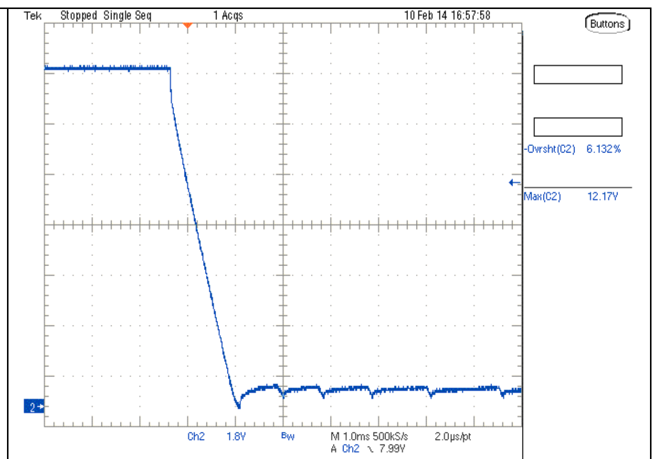
Test conditions:

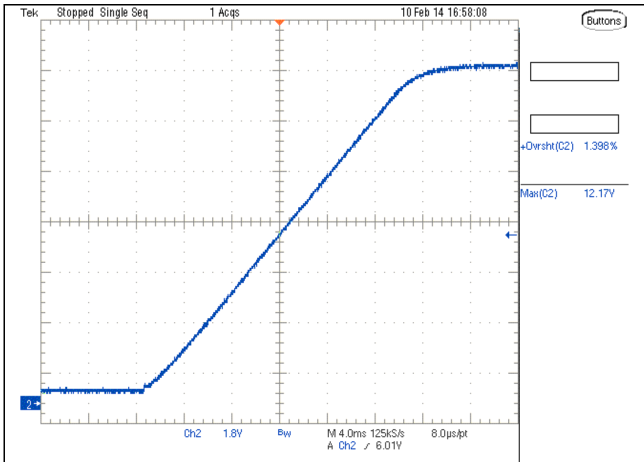
Sample NO.1

AMB. 25℃

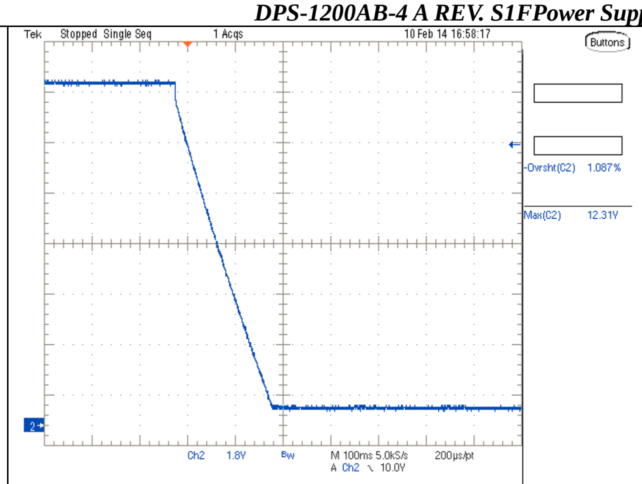
Graphical Result: PASS

	
+12V Turn on overshoot; I/P: 90Vac,O/P:Min load ,O/P With Min Cap. CH2: +12V	+12V Turn off undershoot; I/P: 90Vac,O/P:Min load ,O/P With Min Load Cap. CH2: +12V

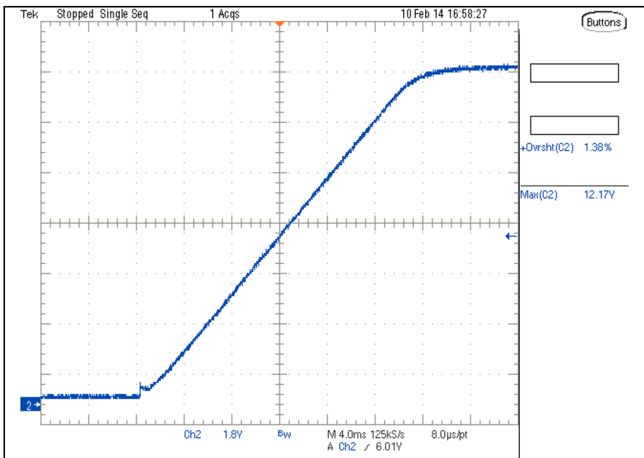
	
+12V Turn on overshoot; I/P: 90Vac,O/P:Max load ,O/P With Min Cap. CH2: +12V	+12V Turn off undershoot; I/P: 90Vac,O/P:Max load ,O/P With Min Load Cap. CH2: +12V



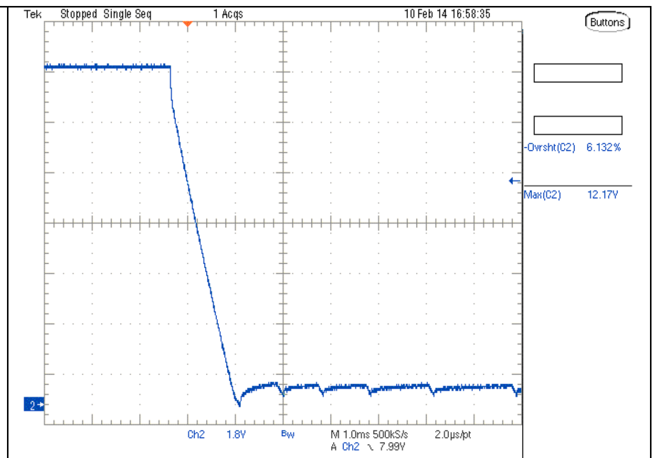
+12V Turn on overshoot; I/P: 100Vac,O/P:Min load ,O/P With Min Cap.
CH2: +12V



+12V Turn off undershoot; I/P: 100Vac,O/P:Min load ,O/P With Min Load Cap.
CH2: +12V



+12V Turn on overshoot; I/P: 100Vac,O/P:Max load ,O/P With Min Cap.
CH2: +12V



+12V Turn off undershoot; I/P:100Vac,O/P:Max load ,O/P With Min Load Cap.
CH2: +12V

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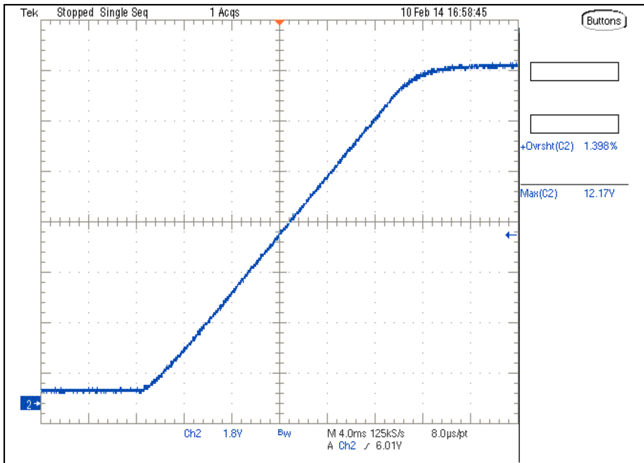
<td>
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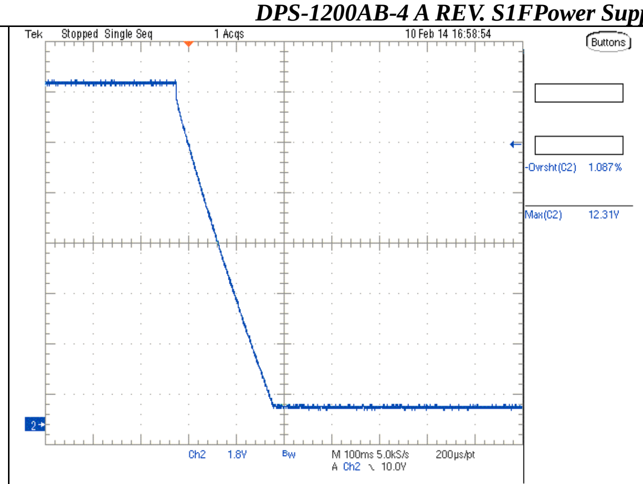
<td>
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<td>+12V Turn on overshoot; I/P:200Vac,O/P:Min load ,O/P With Min Cap.
CH2: +12V</td>
<td>+12V Turn off undershoot; I/P: 200Vac,O/P:Min load ,O/P With Min Load Cap.
CH2: +12V</td>
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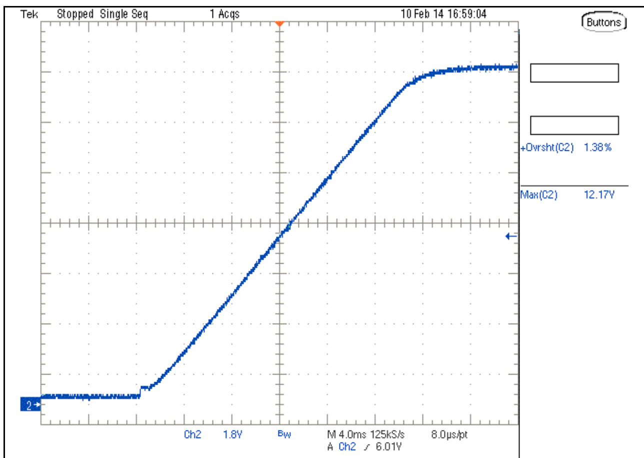
<td>
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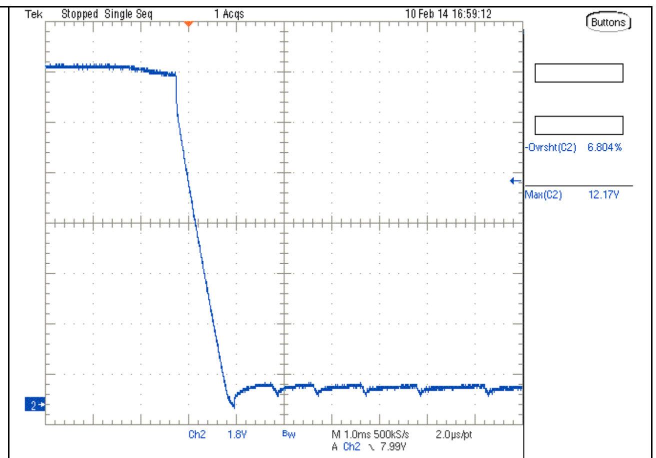
<td>
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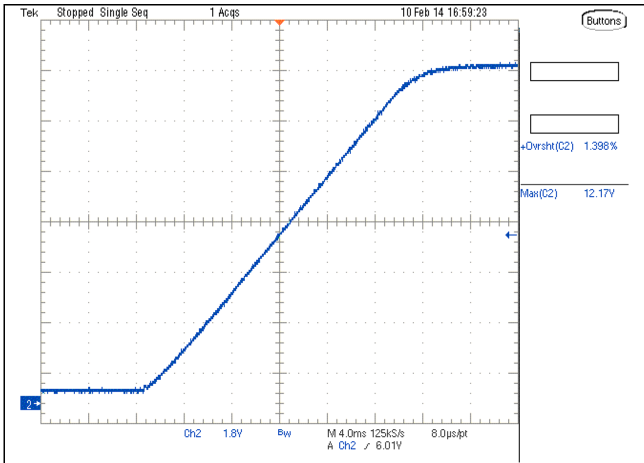

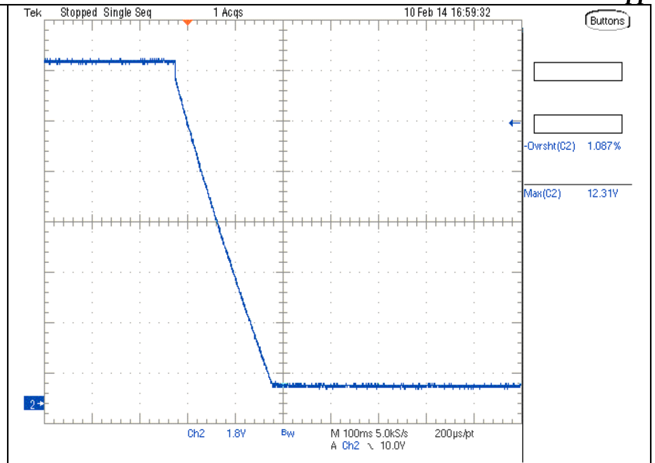

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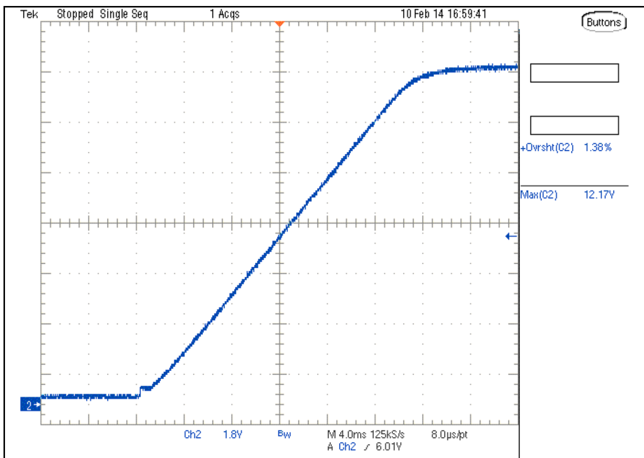

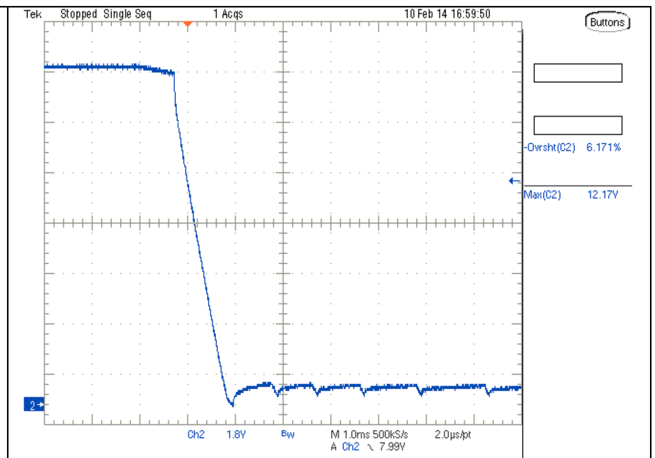

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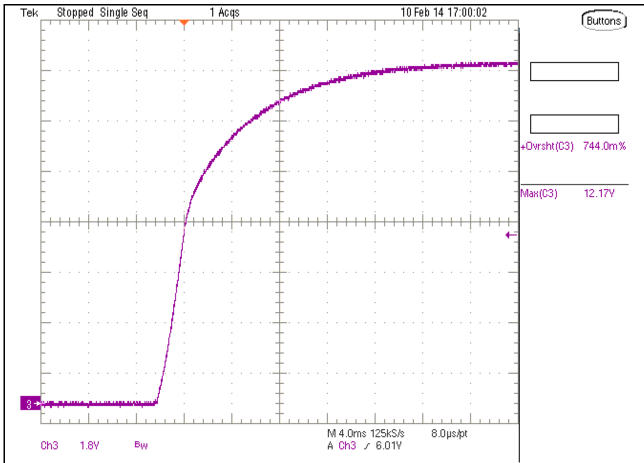

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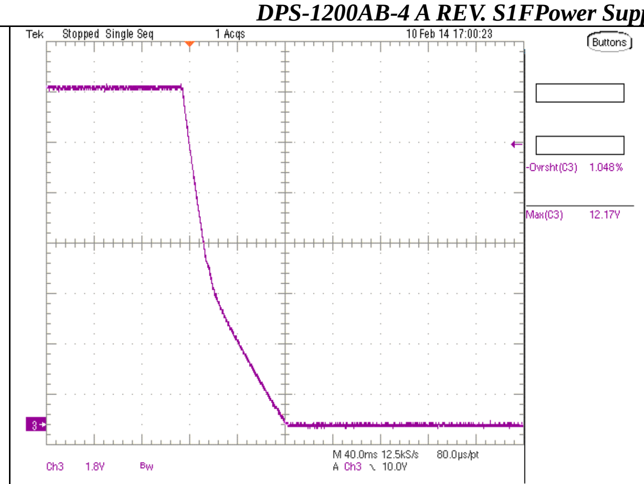

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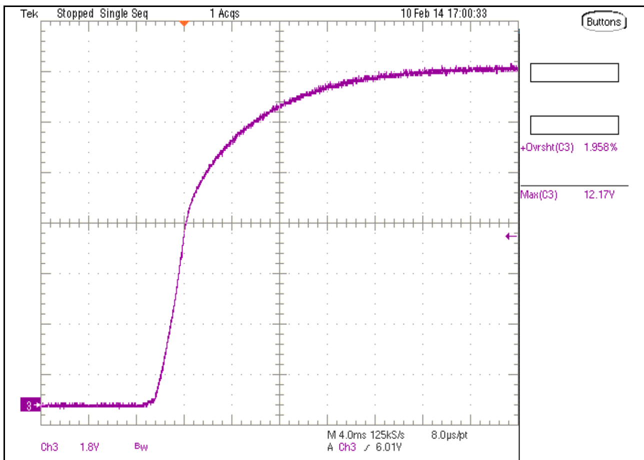

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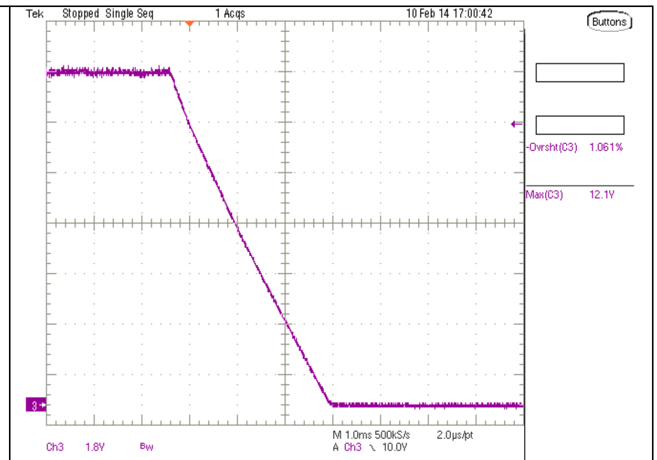

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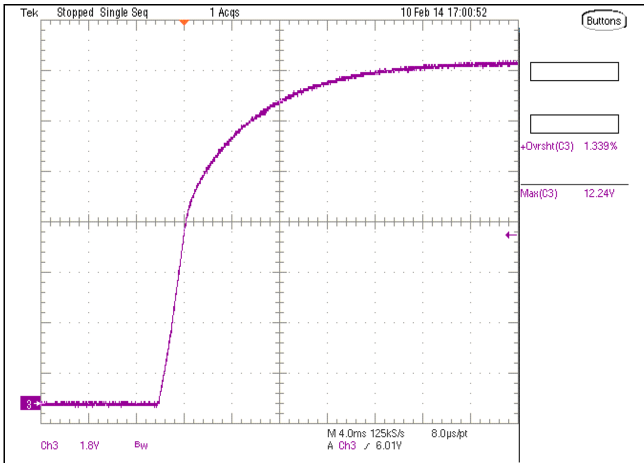	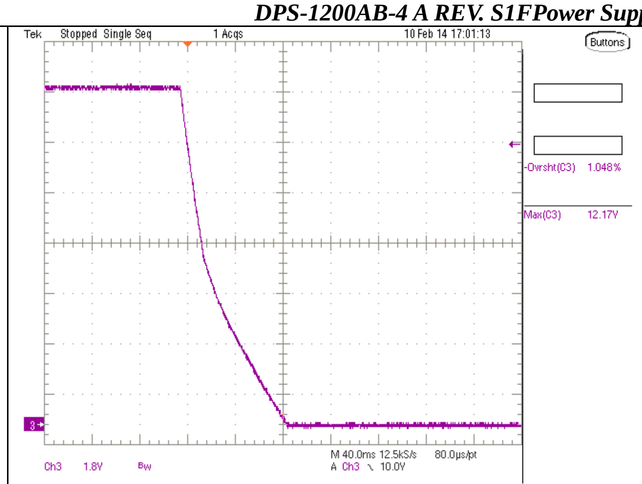
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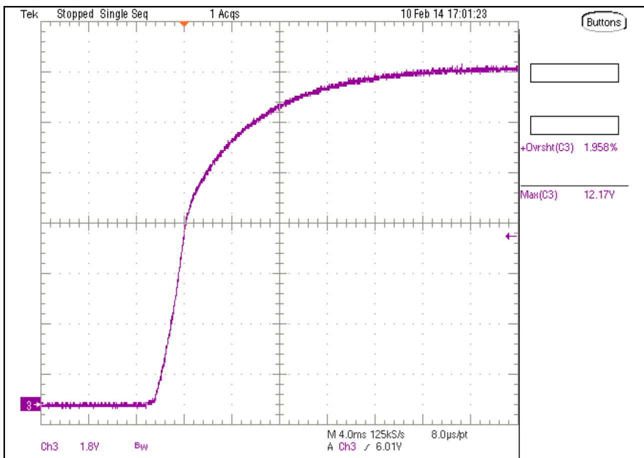	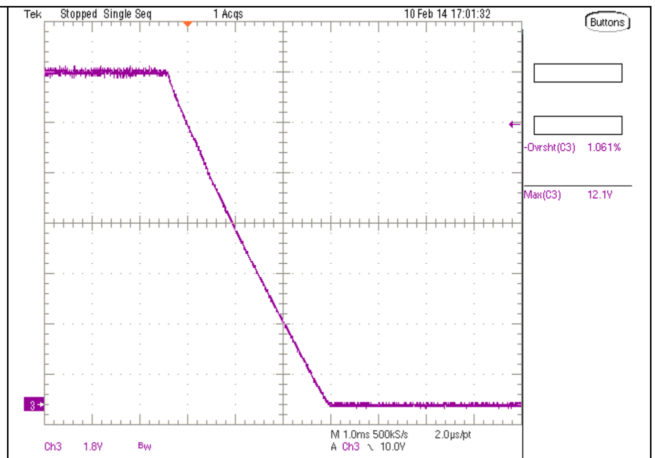
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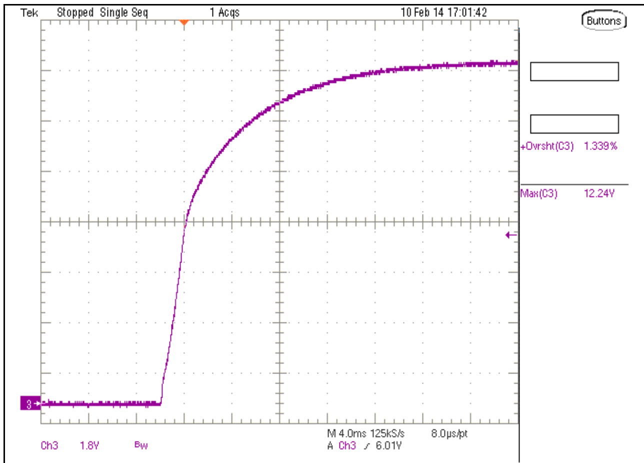

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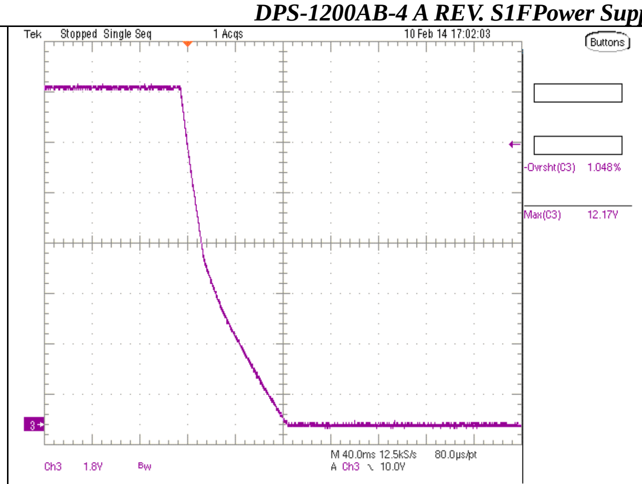

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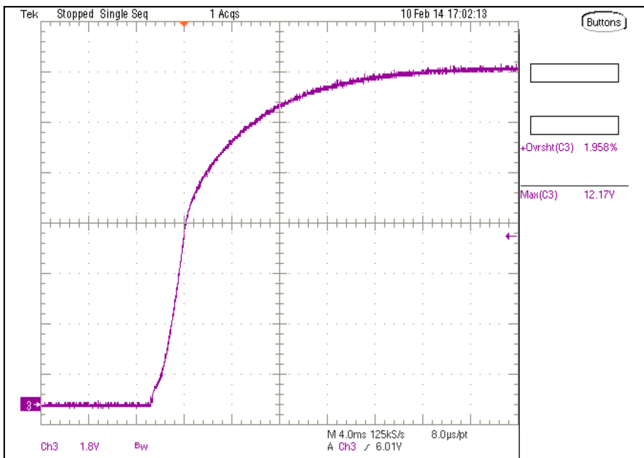

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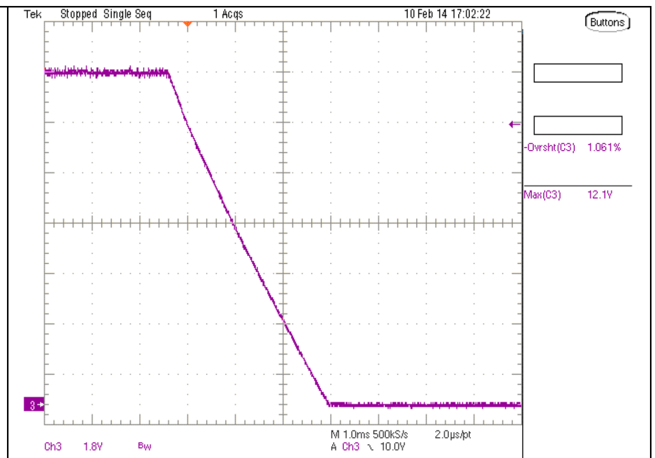

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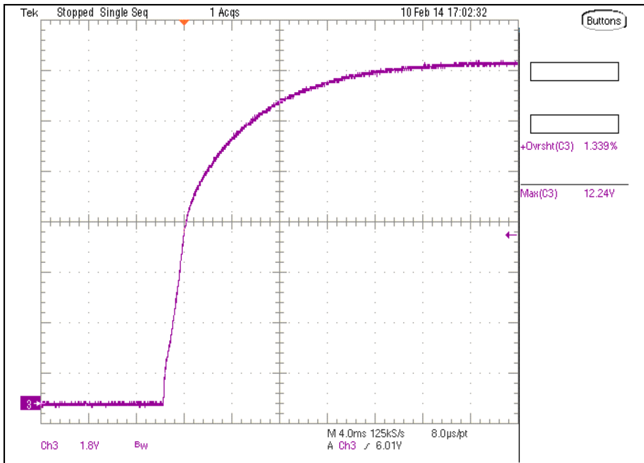
<td>
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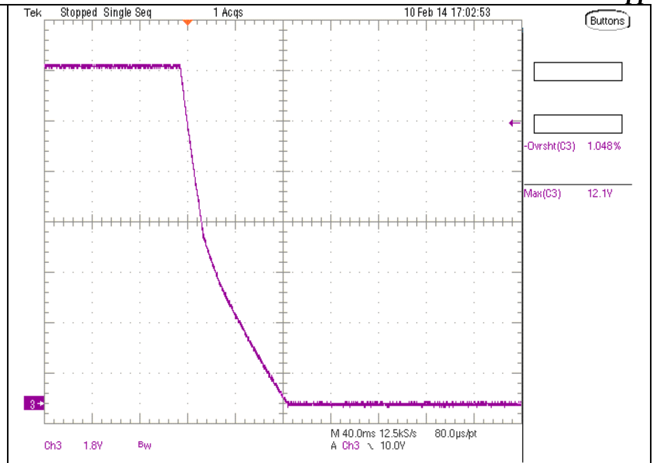
<td>
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CH3: +12Vsb</td>
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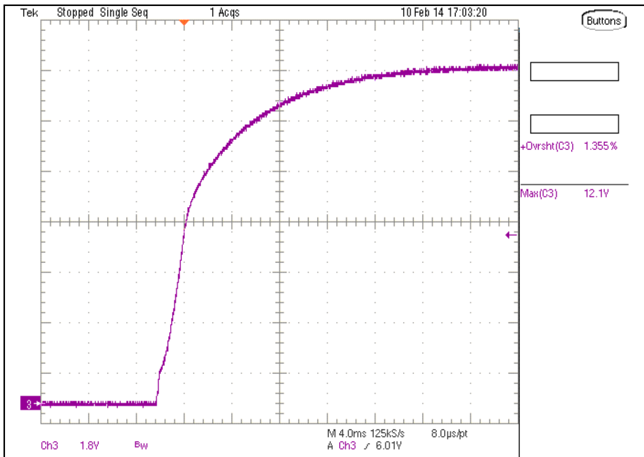
<td>
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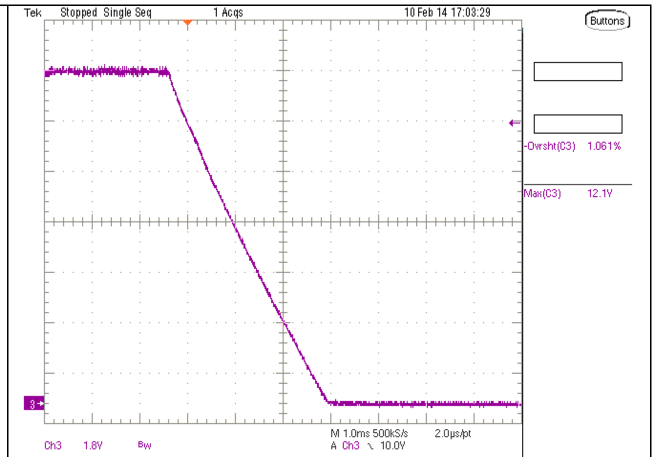
<td>
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3.2.15 Fan curve

DPS-1200AB-4 A Fan curve												
	12V											12VSB
NTC temp	0%	<=10%	<=20%	<=30%	<=40%	<=50%	<=60%	<=70%	<=80%	<=90%	<=100%	**
25	4600	3450	3450	4600	4600	6900	8050	9200	13800	16100	17250	4600
30	5750	3450	3450	4600	4600	6900	8050	9200	13800	17250	18400	4600
35	5750	4600	4600	4600	4600	6900	8050	11500	14950	18400	19550	4600
40	6900	4600	4600	4600	5750	7360	9660	13800	17250	19550	20700	4600
45	6900	4600	4600	4600	6900	8510	10810	14950	19550	21160	23000	4600
50	6900	5750	6900	8050	10810	12650	14950	18860	23000	23000	23000	4600
55	8750	8750	9900	11050	13810	15650	17950	21860	23000	23000	23000	16000
58	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	23000	16000

The fan speed between the rated percent load is calculated by interpolation method. For example, in the high line fan curve at 45% load 25degC the fan speed = (4600+6900)/2, which is 5750 Rpm. At 40% load 42.5degC the fan speed = (11500+9200)/2, which is 10350 Rpm.

Fan speed control method is same as 800W / 1600W.

-The correct FAN curve is added in ES. Only one Fan curve is used.

Fan speed follows load condition and temperature condition. Load condition will also derate when the PSU operates in low line.

For example, At 25degC(Ambient)

High Line:Load 90%(88.2A), Fan speed is 16100RPM.Low Line:Load 90%(73.8A), Fan speed is also 16100RPM.

-Also add fan boost condiiton.

Ex. When inlet temperature is higher than outlet temperature by 5degC, fan speed will boost to maximum speed. After inlet temperature is lower than outlet temperature by 3degC, the fan speed will follow the fan speed control table.

4. PSU Mode / Parallel Mode / Redundancy / SMART_ON Redundancy

4.1 Standby Mode

The PSU can be set to standby mode via PSOFF. In standby mode the +12V main output is turned OFF, only the +12VSB standby output is powered.

4.2 Parallel Mode(General)

For power extension and for redundancy, a minimum of 4 PSUs can be connected in parallel to reach the necessary output power and/or to fulfill redundancy, phase redundancy and dual feed requirement

4.3 Power Calculation in Paraller Mode

	1+1 or 1+0		2+1		3+1	
	+12V	+12VSB	+12V	+12VSB	+12V	+12VSB
Low Line(90V-132V)	82A	2A	147.6A	4A	221.4	6A
High Line(200V-264V)	98A	2A	176.4A	4A	264.6A	6A
min. dynamic	1A	0.05A	2A	0.1A	3A	0.15A
min. static	0.5A	0.05A	1A	0.05A	1.5A	0.05A
Start up current(Low Line)	82A	2A	90.2	2A	90.2	2A
Start up current(High Line)	98A	2A	107.8A	2A	107.8A	2A
Max dynamic current	49A	1A	49A	1A	49A	1A

Table12: Output Current in Parallel Mode

4.4 Mixed Mode Operation (N/A)

A mix of 460W, 800W and 1200W PSUs will not cause the units to shut down and will not have any impact to the system. Redundancy is only guaranteed if the total maximum power of all low power versions will not be exceeded. Power sharing under mix mode operation is fully supported.

4.5 Hot Swap Requirement

Hot swapping a PSU is the process of inserting and extracting a PSU from an operating power system. During this process the output voltages (including +12VSB) remain within the limits specified. The hot swap test is executed when the system is operating under both, static and dynamic conditions.

The PSU can be hot swapped by the following methods:

Extraction:

1. System management turns off only one of the PSUs before it is removed from the system.
2. The AC input of one of the PSUs is unplugged before the PSU is extracted from the running system.

Insertion:

1. A PSU is inserted into the system. The PSOFF signal is immediately applied to the newly inserted PSU.
2. Depending on the state of the system (ON or OFF), the inserted PSU stays in standby mode or is turned ON via its PSOFF signal after a period of time.

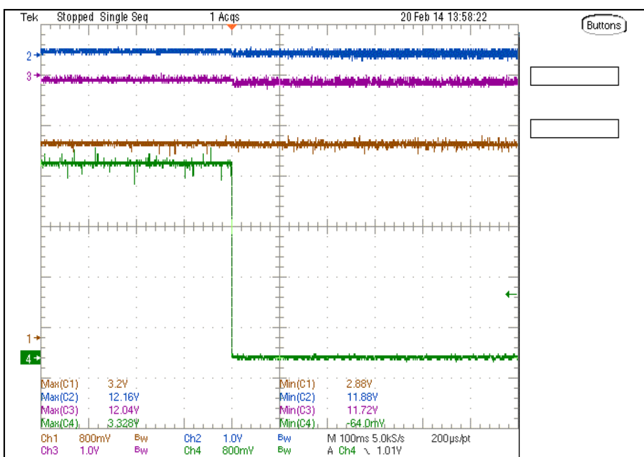
In general, a failed (off by internal latch or external control) PSU can be removed and replaced by a new PSU; However, hot swap can work with operational as well as failed PSUs. The newly inserted PSU can get turned ON by insertion, by plugging input voltage into the external face, or by system management recognizing an inserted PSU and explicitly turning it on.

Test conditions:

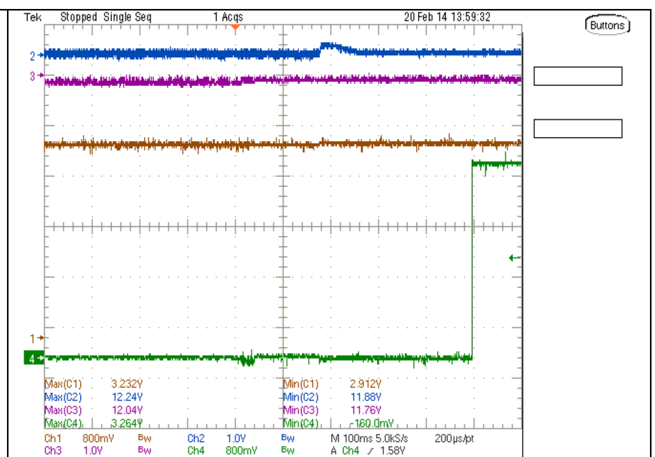
Sample NO.1

AMB. 25℃

Graphical Result: PASS



Plug-out PS2-230Vac
(1) PS_OK 1
(2) +12V
(3) 12Vsb
(4) PS_OK 2



Plug-in PS2-230Vac
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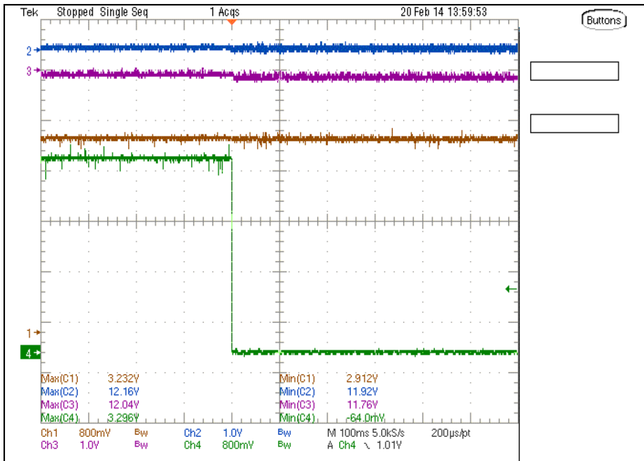
(3) 12Vsb
(4) PS_OK 2



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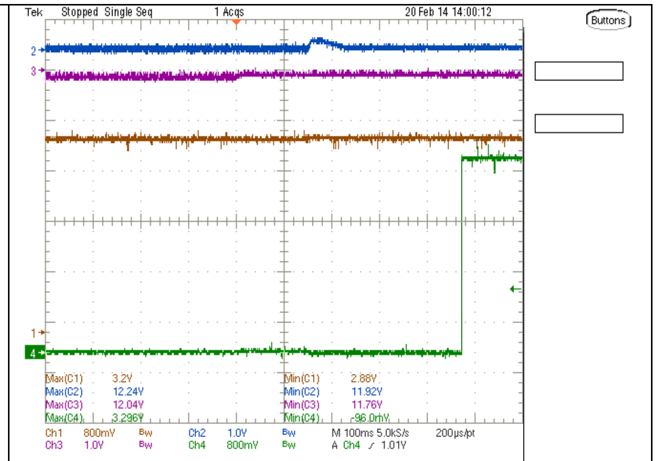

Plug-in PS2-115Vac
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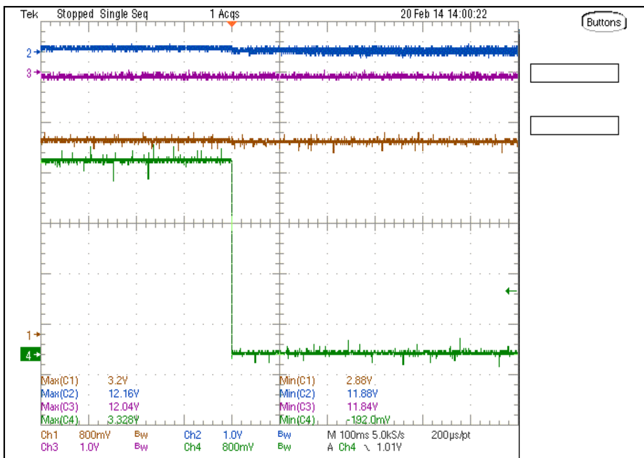
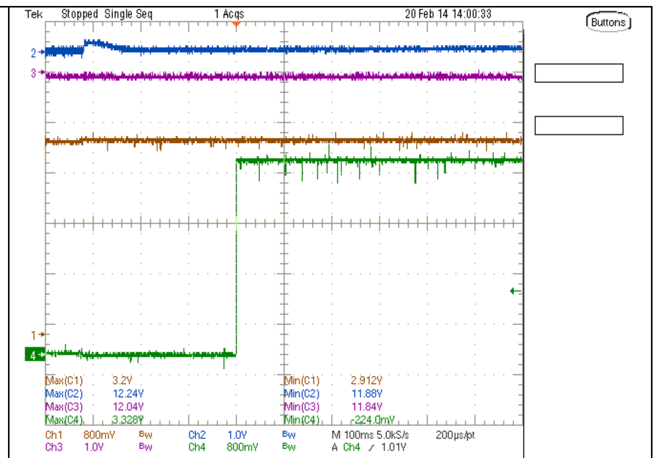
(2) +12V
(3) 12Vsb
(4) PS_OK 2



PS-Off PS2-230Vac
(1) PS_OK 1
(2) +12V
(3) 12Vsb
(4) PS_OK 2



PS-On PS2-230Vac
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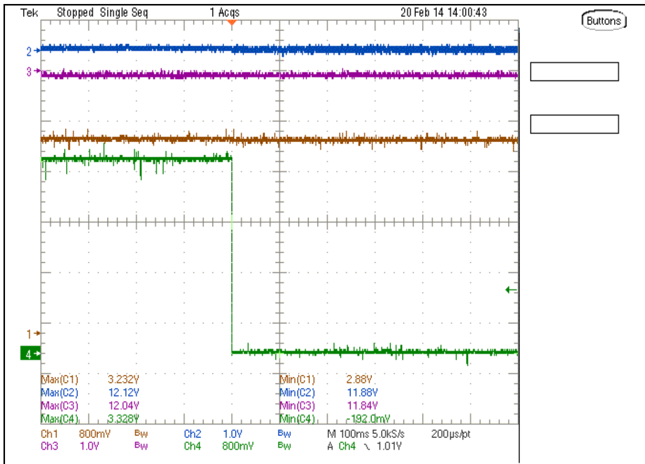
(4) PS_OK 2



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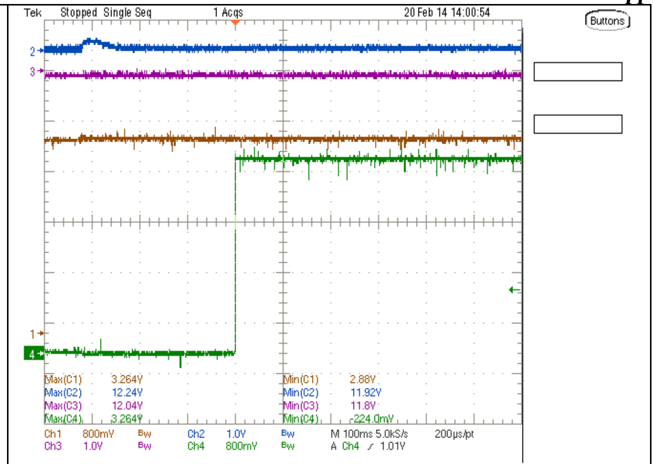
(4) PS_OK 2



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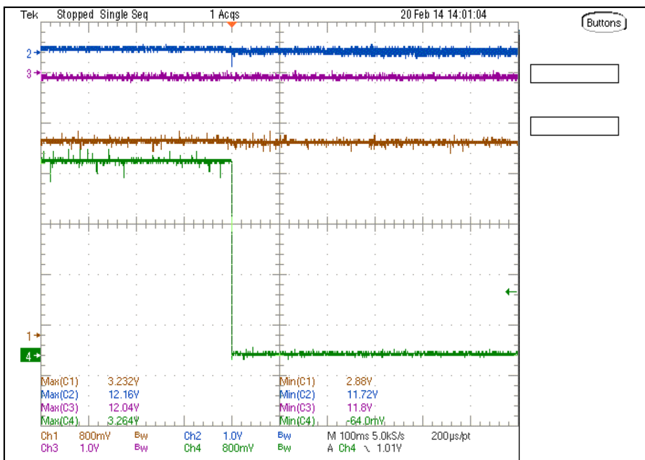
(4) PS_OK 2



AC-out PS2-230Vac
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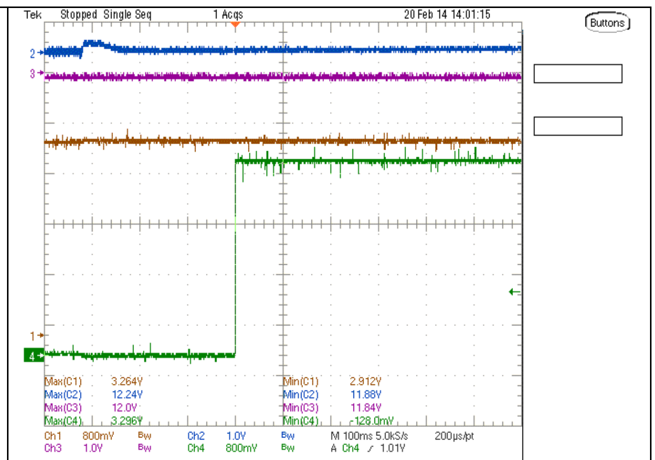

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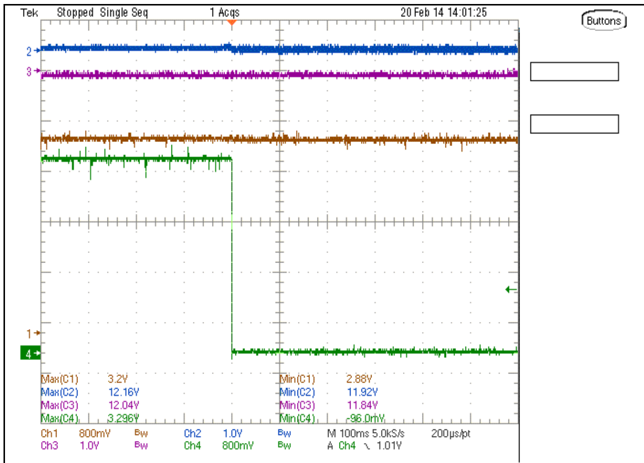

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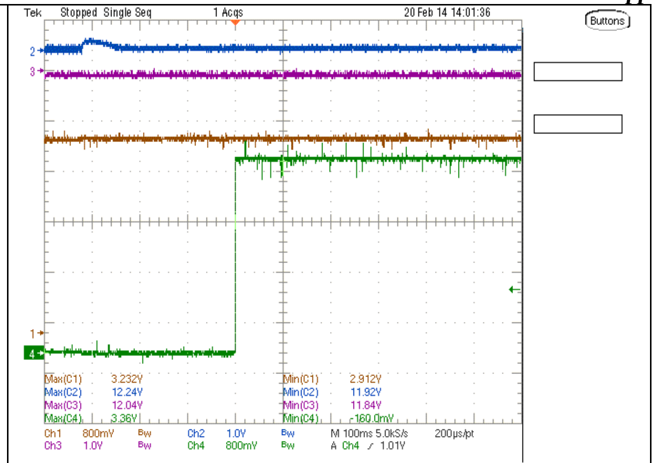

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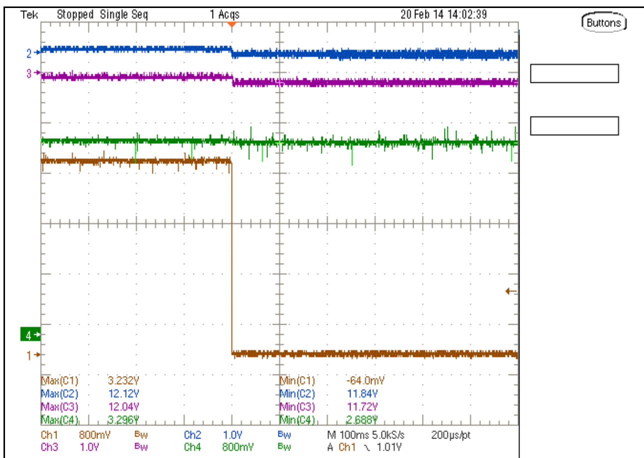
(3) 12Vsb
(4) PS_OK 2



Plug-out PS1-230Vac
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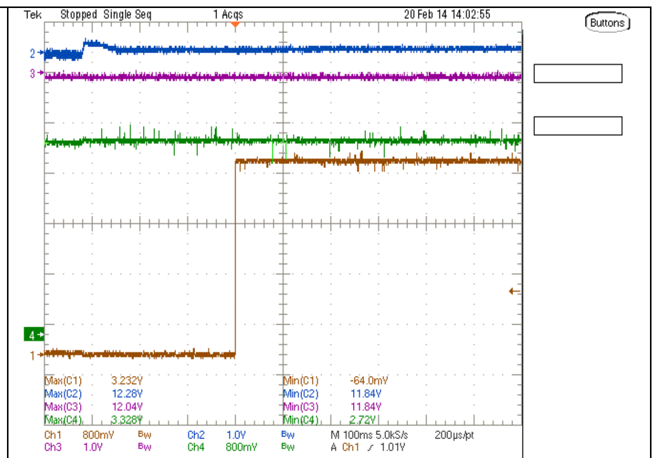
(3) 12Vsb
(4) PS_OK 2



Plug-in PS1-230Vac
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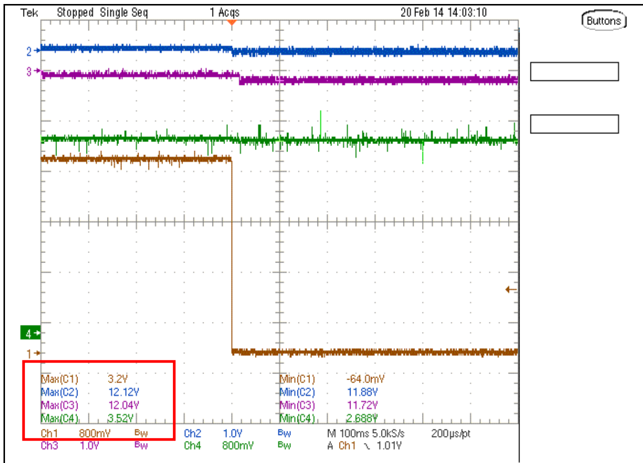
(2) +12V
(3) 12Vsb
(4) PS_OK 2



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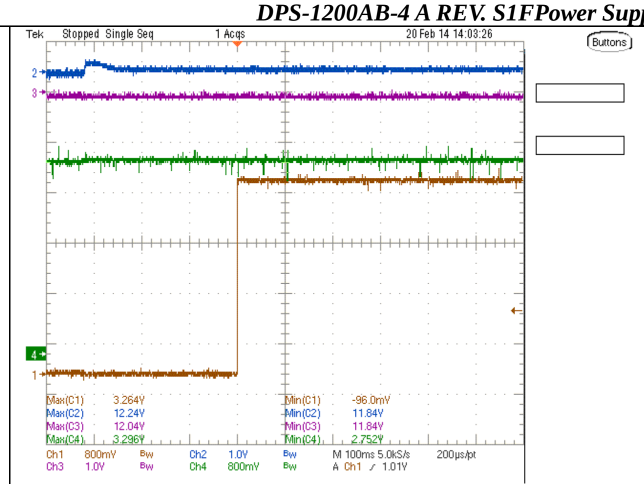
(4) PS_OK 2



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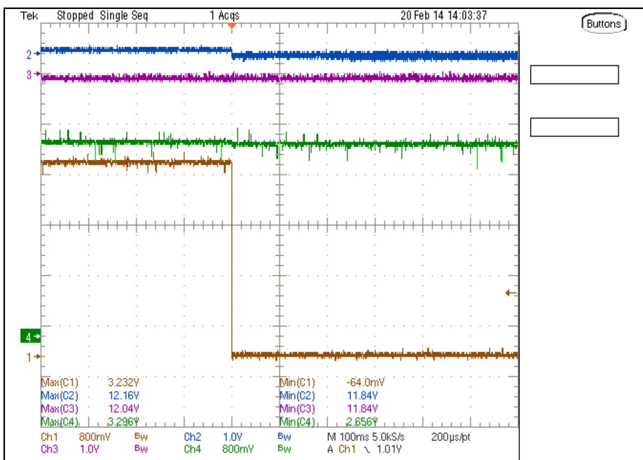
(3) 12Vsb
(4) PS_OK 2



PS-Off PS1-230Vac
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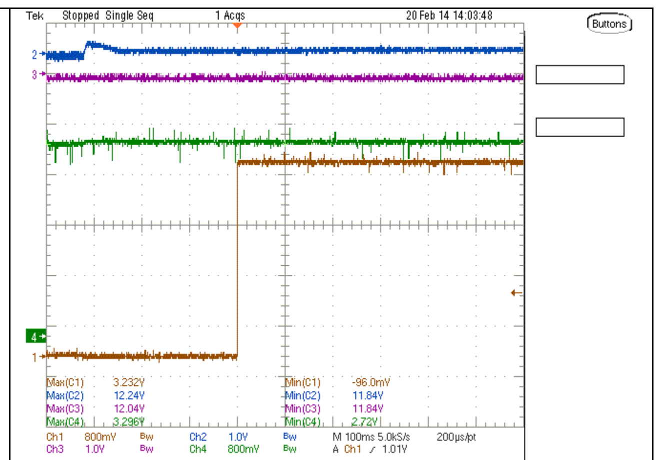
(2) +12V
(3) 12Vsb
(4) PS_OK 2



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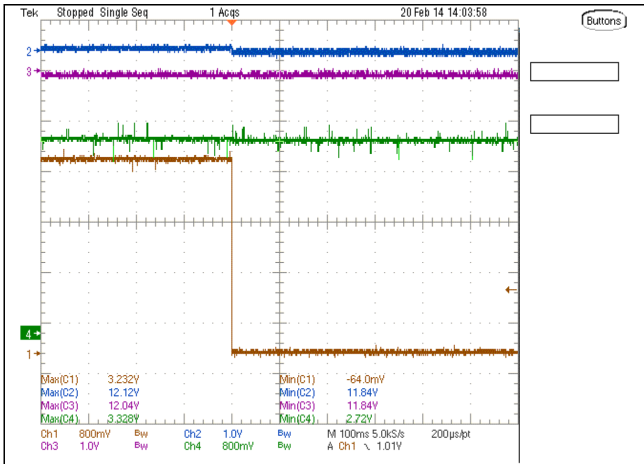
(3) 12Vsb
(4) PS_OK 2



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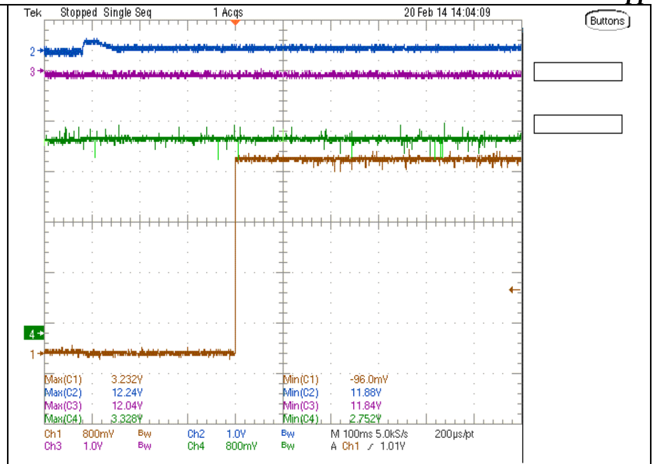

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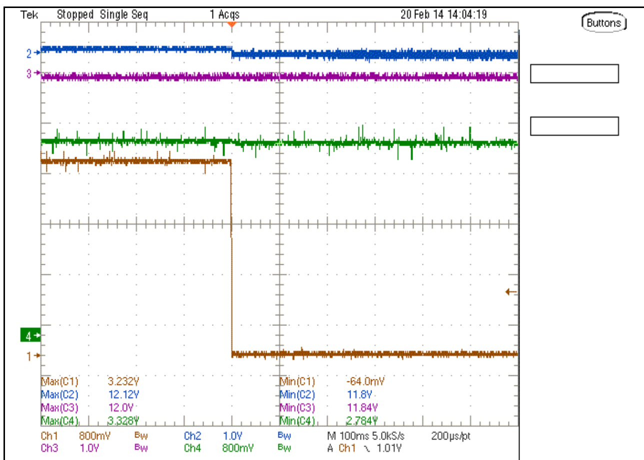
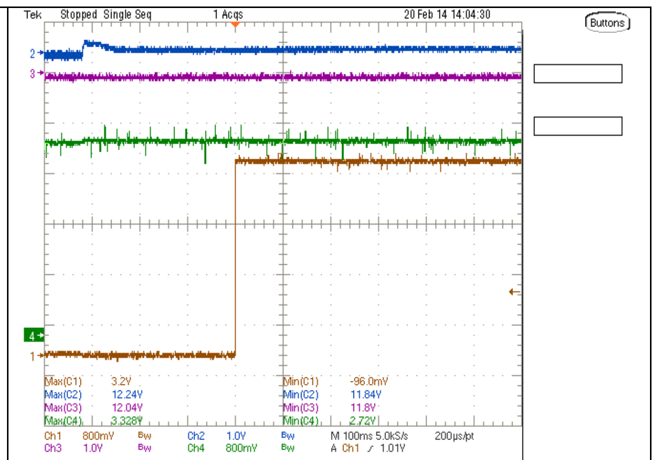
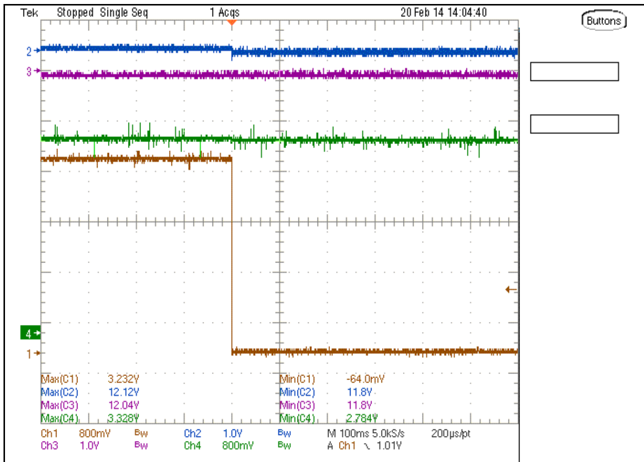
(4) PS_OK 2

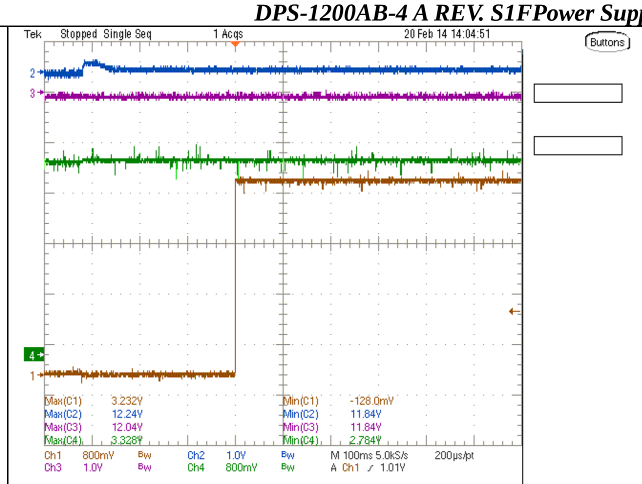


AC-out PS1-230Vac
(1) PS_OK 1
(2) +12V
(3) 12Vsb
(4) PS_OK 2



AC-in PS1-230Vac
(1) PS_OK 1
(2) +12V
(3) 12Vsb
(4) PS_OK 2





AC-out PS1-115Vac (1) PS_OK 1 (2) +12V (3) 12Vsb (4) PS_OK 2	AC-in PS1-115Vac (1) PS_OK 1 (2) +12V (3) 12Vsb (4) PS_OK 2

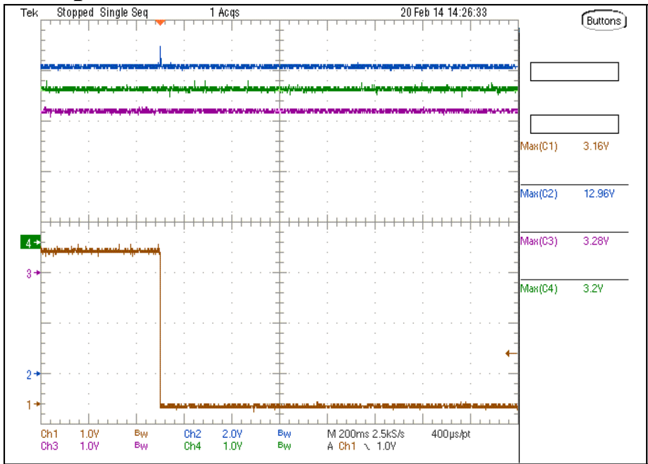
4.5 Hot Swap Requirement
+12V Output Over Voltage Condition

Test conditions:

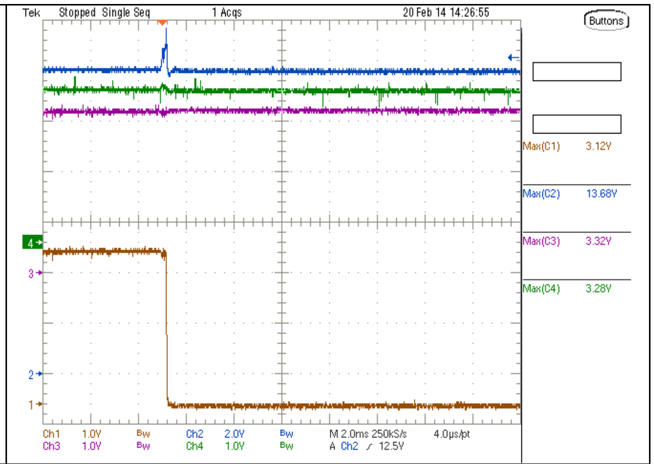
Sample NO.1+1

AMB. 25℃

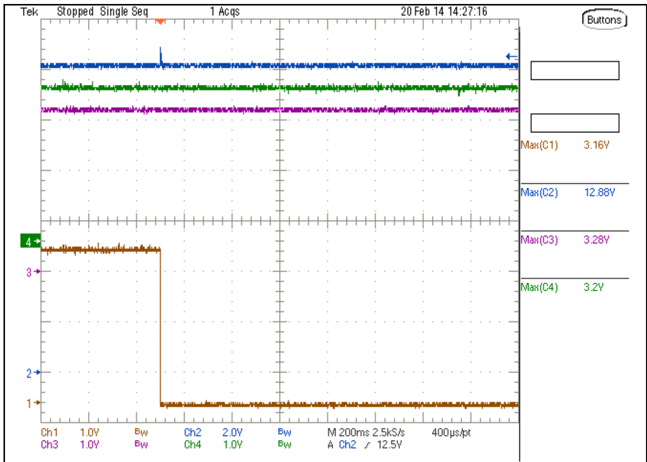
Graphical Result: PASS



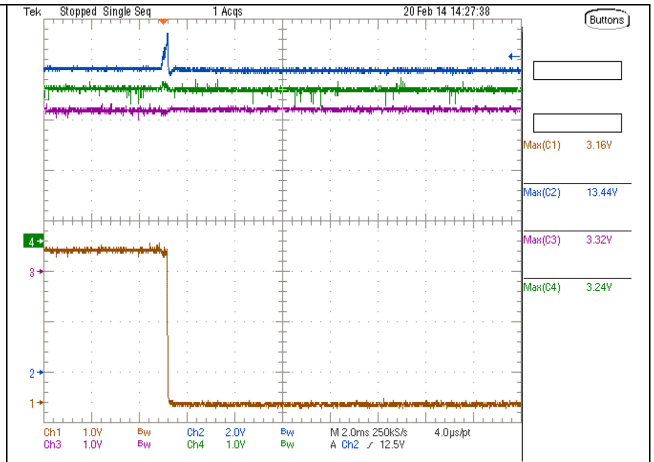
+12V OVP Turn on then OVP;
I/P:90Vac,O/P:Min load
(1) PWOK1
(2) 12V
(3) SMB Alert
(4) PWOK2



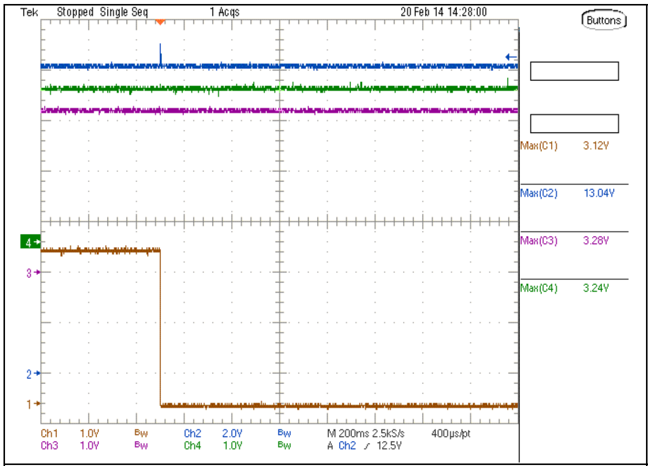
+12V OVP Turn on then OVP;
I/P:90Vac,O/P:Max load
(1) PWOK1
(2) 12V
(3) SMB Alert
(4) PWOK2



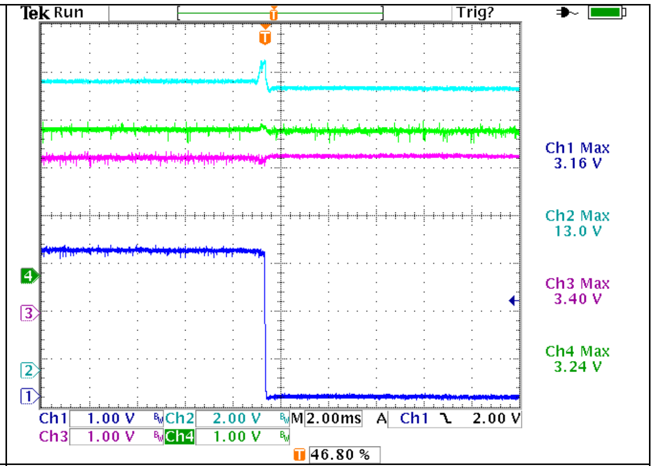
+12V OVP Turn on then OVP;
I/P:100Vac,O/P:Min load
(1) PWOK1
(2) 12V
(3) SMB Alert
(4) PWOK2



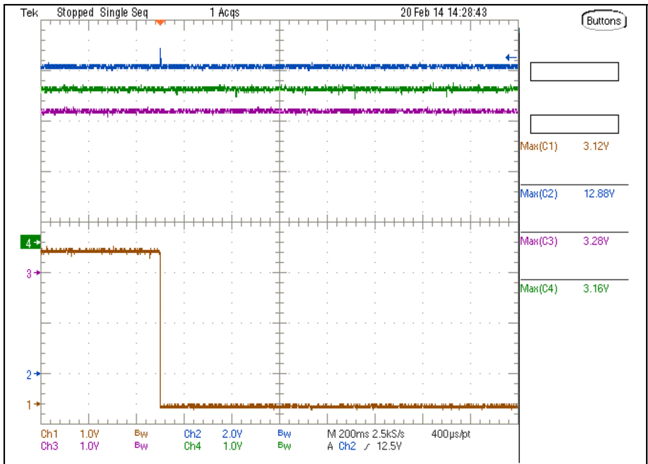
+12V OVP Turn on then OVP;
I/P:100Vac,O/P:Max load
(1) PWOK1
(2) 12V
(3) SMB Alert
(4) PWOK2



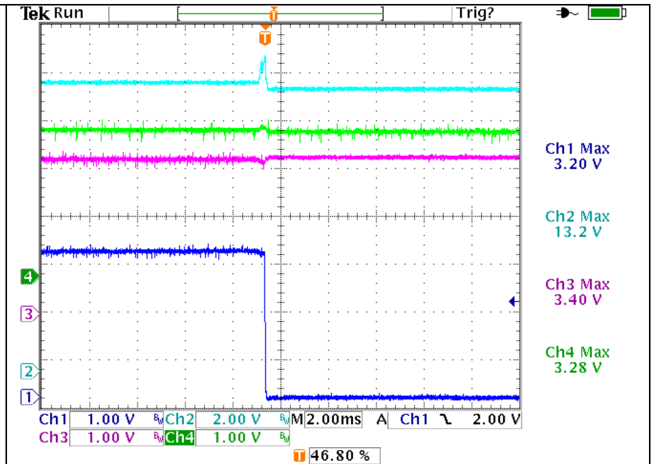
+12V OVP Turn on then OVP;
I/P:200Vac,O/P:Min load
(1) PWOK1
(2) 12V
(3) SMB Alert
(4) PWOK2



+12V OVP Turn on then OVP;
I/P:200Vac,O/P:Max load
(1) PWOK1
(2) 12V
(3) SMB Alert
(4) PWOK2



+12V OVP Turn on then OVP;
I/P:264Vac,O/P:Min load
(1) PWOK1
(2) 12V
(3) SMB Alert
(4) PWOK2



+12V OVP Turn on then OVP;
I/P:264Vac,O/P:Max load
(1) PWOK1
(2) 12V
(3) SMB Alert
(4) PWOK2

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	PSU_1 Read Data	Pssu_2 Read Data
1	STATUS_WORD	79h	60/88h	00/00h
2	STATUS_VOUT	7Ah	80h	00h
3	STATUS_IOUT	7Bh	00h	00h

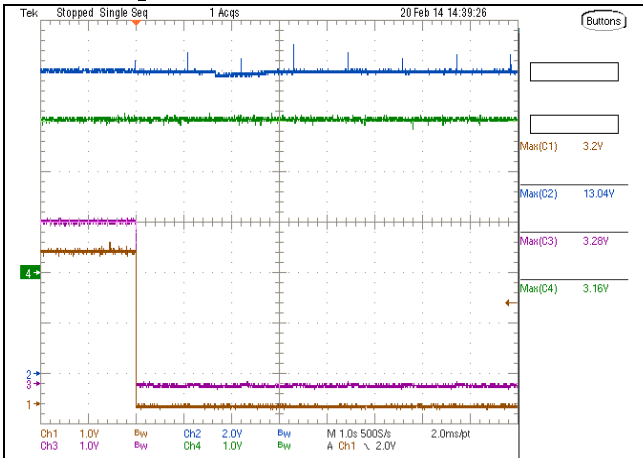
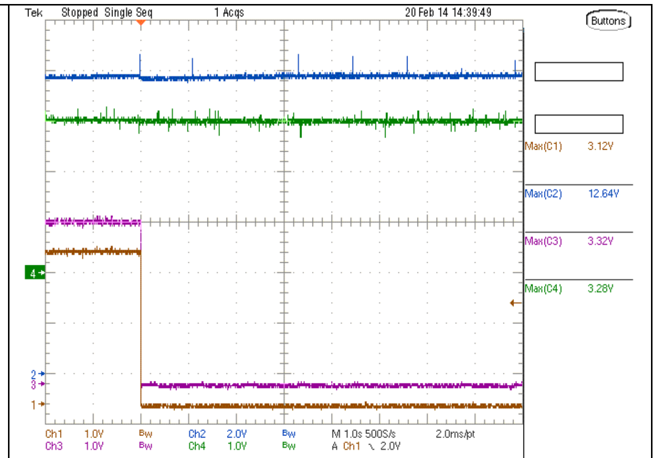
4.5 Hot Swap Requirement
+12Vsb Output Over Voltage Condition

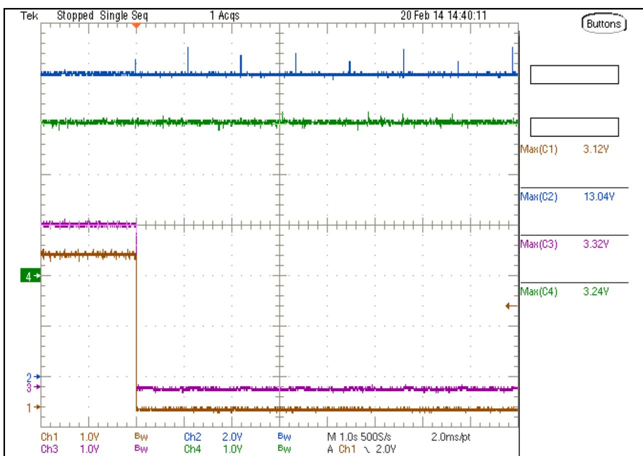
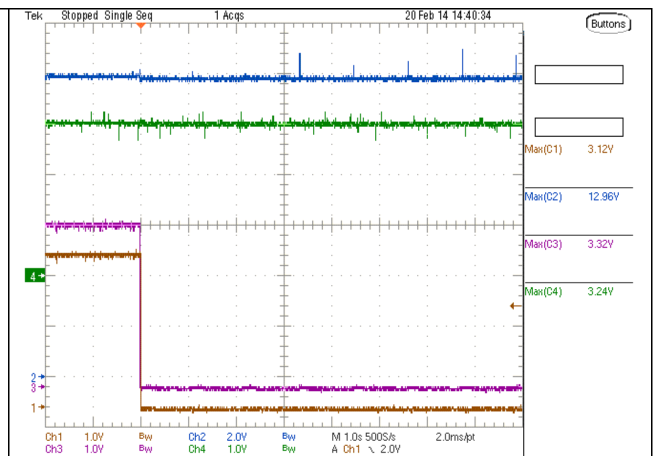
Test conditions:

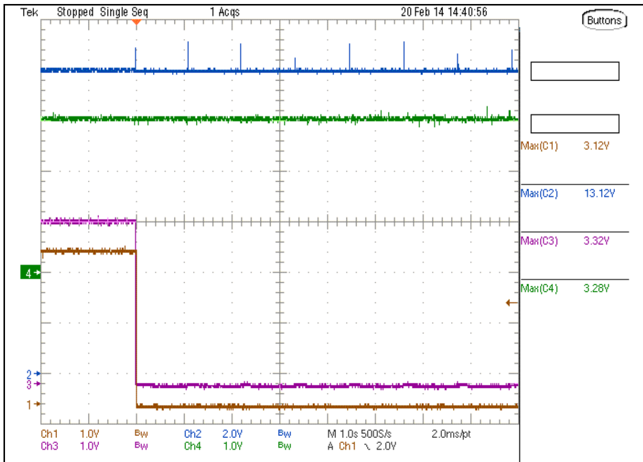
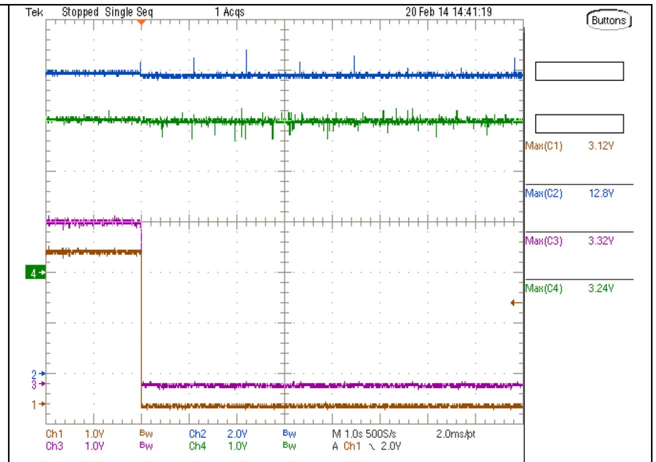
Sample NO.1+1

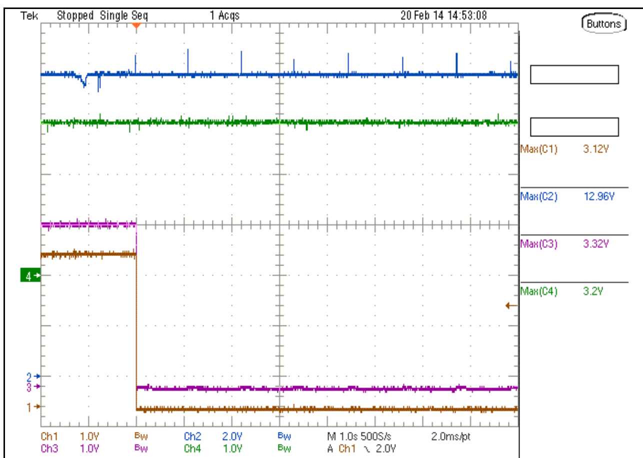
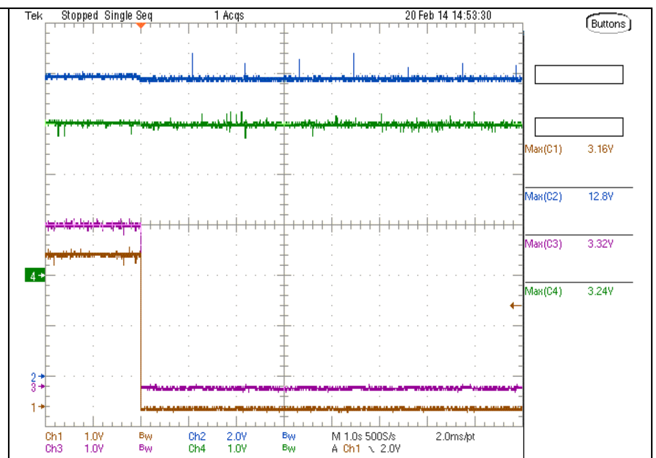
AMB. 25℃

Graphical Result: PASS

	
+12Vsb OVP Turn on then OVP; I/P:90Vac,O/P:Min load (1) PWOK1 (2) 12Vsb (3) SMB Alert (4) PWOK2	+12Vsb OVP Turn on then OVP; I/P:90Vac,O/P:Max load (1) PWOK1 (2) 12Vsb (3) SMB Alert (4) PWOK2

	
+12Vsb OVP Turn on then OVP; I/P:100Vac,O/P:Min load (1) PWOK1 (2) 12Vsb (3) SMB Alert (4) PWOK2	+12Vsb OVP Turn on then OVP; I/P:100Vac,O/P:Max load (1) PWOK1 (2) 12Vsb (3) SMB Alert (4) PWOK2

	
+12Vsb OVP Turn on then OVP; I/P:200Vac,O/P:Min load (1) PWOK1 (2) 12Vsb (3) SMB Alert (4) PWOK2	+12Vsb OVP Turn on then OVP; I/P:200Vac,O/P:Max load (1) PWOK1 (2) 12Vsb (3) SMB Alert (4) PWOK2

	
+12Vsb OVP Turn on then OVP; I/P:264Vac,O/P:Min load (1) PWOK1 (2) 12Vsb (3) SMB Alert (4) PWOK2	+12Vsb OVP Turn on then OVP; I/P:264Vac,O/P:Max load (1) PWOK1 (2) 12Vsb (3) SMB Alert (4) PWOK2

4.6 PMBus command for Smart On

4.6.1 Hardware Connection

Before enabling Smart On function, make sure pin B22 (SMART ON) on output golden finger of each PSU is connected together.

4.6.2 Configuring Smart On with SMART_ON_CONFIG (D0h)

The PMBus manufacturer specific command MFR_SPECIFIC_00 is used to configure the operating state of the power supply related to Smart On. We will call the command SMART_ON_CONFIG (D0h). Below is the definition of the values used with the Read-Write Byte SMBus protocol with PEC.

SMART_ON_CONFIG (D0h)		
Value	State	Description
00h	Standard Redundancy	Turns the power supply ON into standard redundant load sharing mode. The power supply's SRED_OK signal ~~(pin25, IC741)~~ (pin54, IC703) will always keep low to make sure no other PSU enter Smart_On mode.
01h	Smart On Active	Defines this power supply to be the one that is always ON in a Smart On configuration. The power supply's SRED_ACTIVE ~~(pin27, IC741)~~ (pin55, IC703) will set low to pull the ~~SMART_RED~~ SMART_ON ~~(pin10, IC741)~~ (pin35, IC703) up.
02h	Smart Standby 1	Defines the power supply that is third to turn off in a Smart On configuration (6s later) and first to turn on as the load increases.
03h	Smart Standby 2	Defines the power supply that is second to turn off in a Smart On configuration (4s later) and second to turn on as the load increases.
04h	Smart Standby 3	Defines the power supply that is first to turn off in a Smart On configuration (2s later) and third to turn on as the load increases.

The default state of power supply is in Standard Redundancy mode. Power supply need to be re-specified a state whenever initial power on or any power supply in the system is in fault situation.

The SMART_ON_CONFIG command will reset to 00h (Standard Redundancy) when any fault or over current happened. The faults include AC loss, over hot spot temperature, over ambient temperature, +12V short internally (under voltage), +12V over voltage, fan locked, D2D controller soft-start short.

4.7 Smart Standby Power Supply Operating State

A power supply is put into Smart Standby whenever PSON is asserted(Low), ~~SMART_RED~~ SMART_ON is asserted(high), and SMART_ON_CONFIG value is set to 02h, 03h, or 04h. In the Smart Standby mode the power supply must:

1. Power ON when Smart_On bus is driven LOW
2. Keep PWOK asserted
3. No PMBus fault or warning conditions reported via STATUS commands
4. keep all fans rolling
5. LED is green blinking

4.7.1 Powering on Smart Standby supplies to maintain best efficiency

Power supplies in Smart Standby state shall monitor the shared voltage level of the load share signal to sense when it needs to power on. Depending upon which position (1, 2, or 3) the system defines that power supply to be in the Smart Standby configuration; will slightly change the load share threshold that the power supply shall power on at.

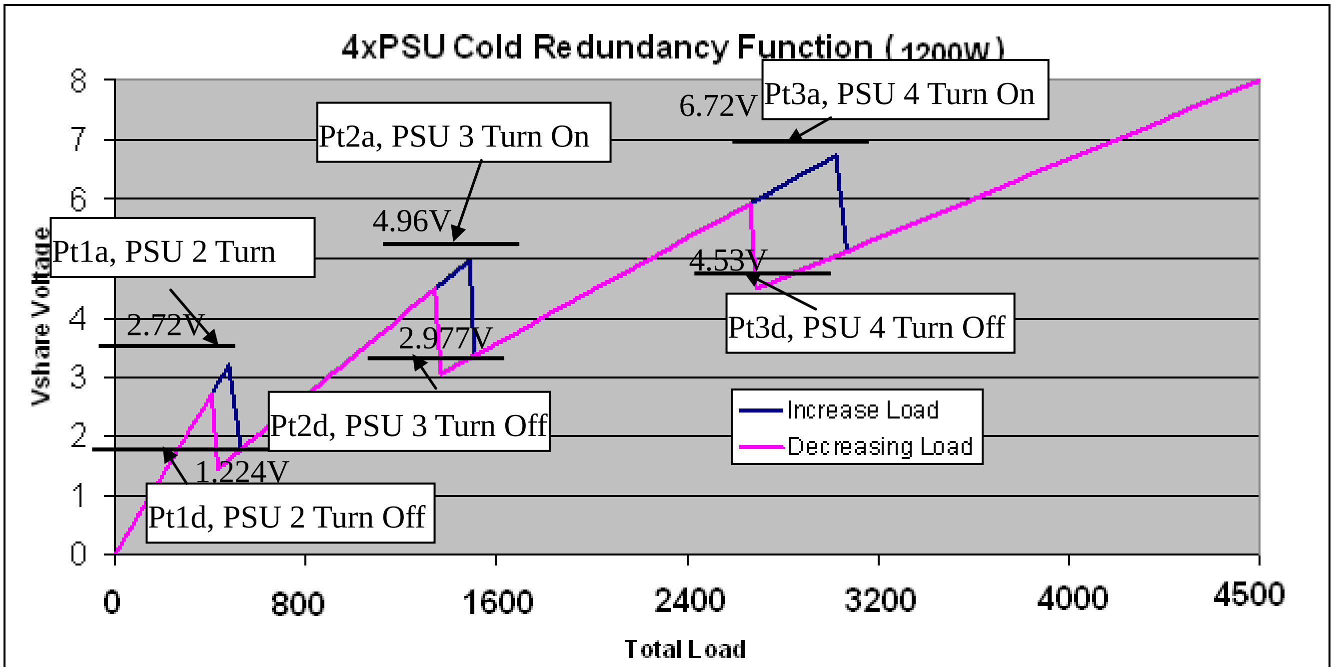
4.7.2 Powering on Smart Standby supplies during a fault or over current condition

Some warnings happen or 12V output shutdown due to any fault will cause SRED_OK driven low.
When an active power supply asserts its SRED_OK signal, all parallel power supplies in Smart Standby mode shall power on immediately.
The trigger condition:
1. 12V OC warning/ fault happens
2. 12V OVP fault
3. 12V UVP (lower than 11.8V)
4. OTP warning/ fault
5. fan speed warning/ fault
6. AC loss (lower than 75V +4/-5V)
7. send 00h to PMBus D0h command
8. PSON# de-assertion happen
9. PSKILL de-assertion happen

When an active power supply asserts its SRED_OK# signal, all parallel power supplies in Smart Standby mode shall power on immediately.

4.8 The Way to Enable Smart On Function

Here are the steps to put PSU into smart on mode. PSU which is assigned as smart on standby can operate in a power-off state and turn on main power if necessary.



Power On/Off of power supplies in Cold Redundant Mode (4x1200W PSUs)

Symbols Definition:

Max load: maximum of total load based on the amount of PSU(98A*4=392A)

Pt1a: 8.5% of **Max load** => 98A*34%=33.32A

Pt1d: 7.65% of **Max load** => 98A*34%*0.9=29.99A

Pt2a: 31% of **max load** => 98A*2*62%=121.52A

Pt2d: 27.9% of **max load** => 98A*2*62%*0.9=109.4A

Pt3a: 63% of **max load** => 98A*3*84%=246.96A

Pt3d: 56.7% of **max load** => 98A*3*84%*0.9=222A

The trigger levels above may have a +/-10% tolerance for actual application.

Step1: Make sure every PSU has AC power cord applied. Use write byte command to set command 0xD0 for each PSU to has it own role (must one PSU as active role).

The command format for Smart On function will be as following example.

B0 in smart_on_active (S B0 w D0 01 PEC P)

B2 in smart_on_standby (S B2 w D0 02 PEC P)

Step2: PSU will enter smart slave mode once the load is lower than the corresponding trigger point.

Step3: If SMART_ON signal falls to low, all PSU will turn on the main power and reset smart_config to

0x00 (standard redundancy). System needs to re-assign the roles for all PSU to enable smart on function again.

Write the PMBus command SMART_ON_CONFIG (D0h) to the PSU. The PSU can be set into a power saving mode. Depending on the necessary power, only a minimum of the paralleled PSUs are supplying into the output rail for working at optimum efficiency. The other PSUs stay in Standby Mode until their additional power is needed due to increasing load. If one of the PSUs fails or detects a line drop and cannot ensure to continue operation, all other PSUs will immediately take over the power to guarantee continuous operation of the system. In Smart_ON Mode there is no loss of PSU redundancy. The SMART_ON signal pin (~~A25~~ B22) of all PSUs must be connected on system side.
By default this function is disabled and must be activated via PMBus command SMART_ON_CONFIG (D0h). When using Smart_ON mode, it is not allowed to turn OFF an active unit via the PSOFF interface. This will disable the Smart_ON function.

4.9 Load Sharing

4.9.1 Forced Load Sharing

The main outputs have forced load sharing. The outputs share within **3%** in the range of 100% output load. All current sharing functions are implemented inside the PSU by making use of load share signals. On system side, the load share signals of the paralleled PSUs must be connected to each other. The PSUs are able to load share with up to 4 PSUs in parallel. There is no support for achieving a symmetrical load share on the +12VSB between PSUs. For efficiency optimization it may be possible to turn OFF the share function.

Sharing accuracy is not measured under transient conditions. Load sharing must be active ≤~~500ms~~ 100ms after PSU start-up and before PWOK is asserted.

4.9.1 Forced Load Sharing

Test conditions:

Sample NO. 1+1

AMB. 25℃

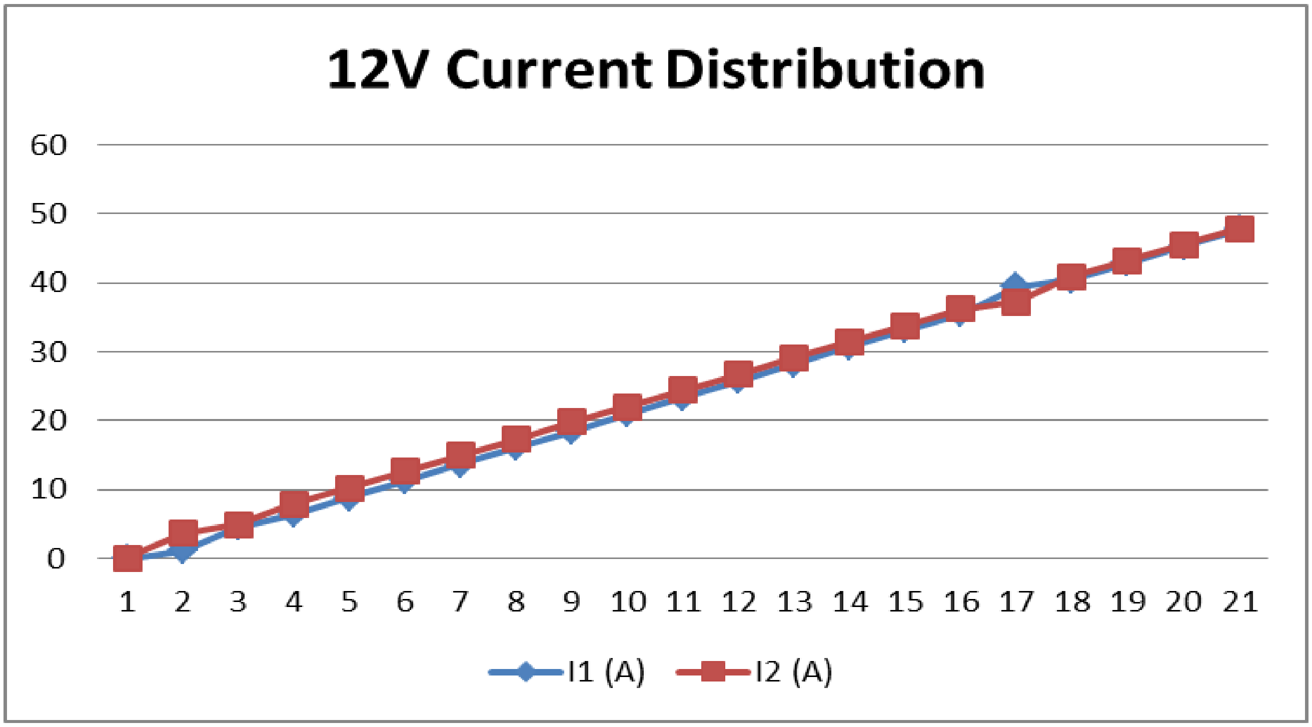
INPUT: 230V/50Hz

Load: +12Vsb/0A

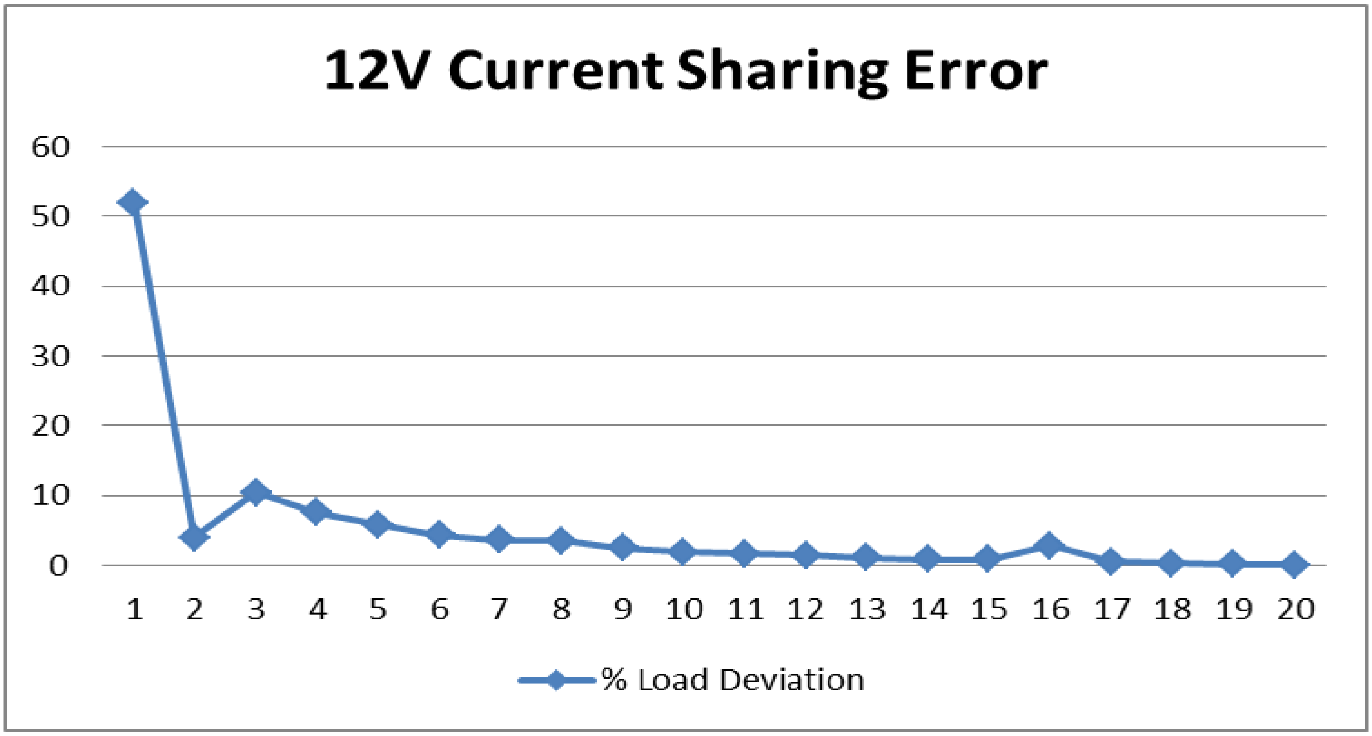
Test Result: PASS

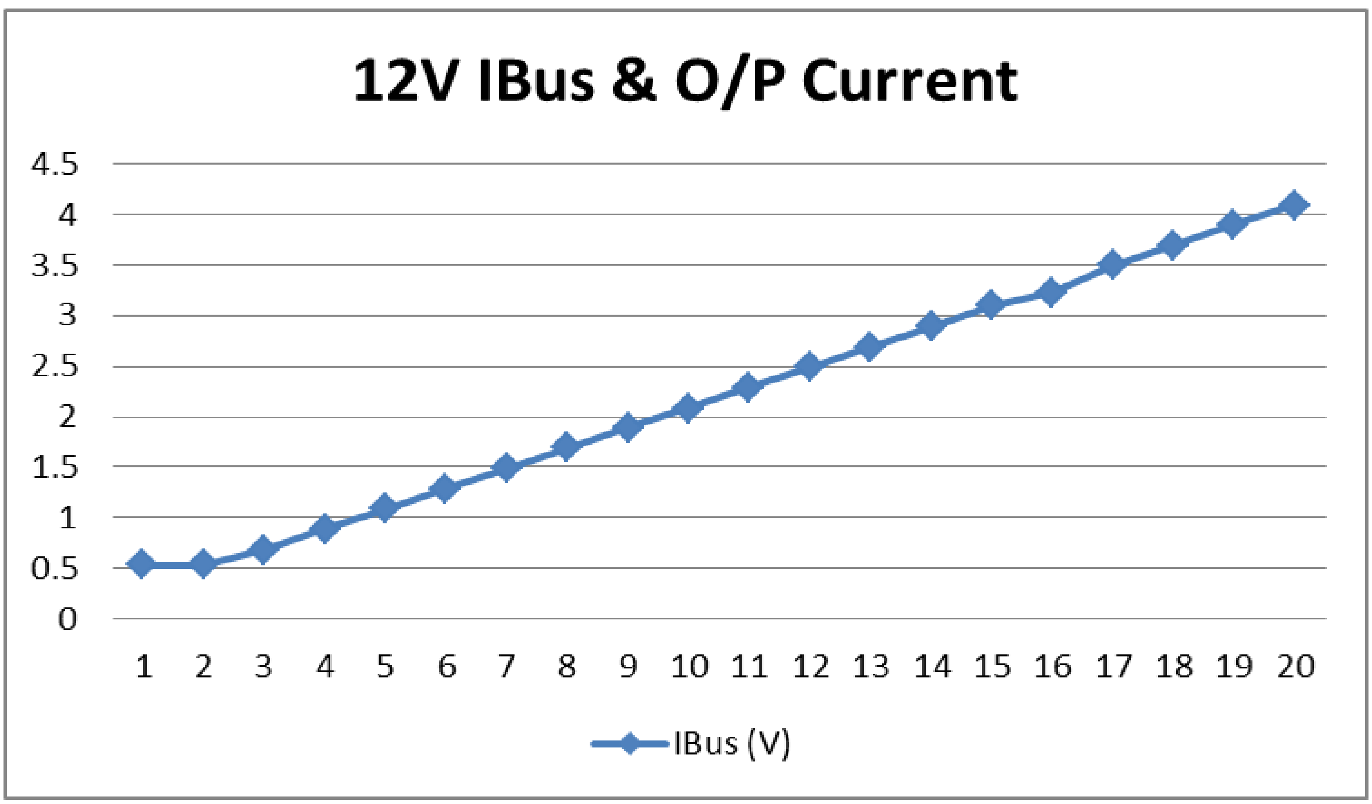
%Load_Deviation={[MAX(I1,I2)-MEAN(I1,I2)]}/MEAN(I1,I2)}*100%

+12V					% Load Deviation
Iout (A)	I1 (A)	I2 (A)	IBus (V)	O/P (V)	
4.9	1.144	3.626	0.536	12.261	52.047
9.8	4.577	4.957	0.536	12.131	3.984
14.7	6.446	7.963	0.683	12.131	10.529
19.6	8.837	10.294	0.887	12.134	7.616
24.5	11.227	12.618	1.086	12.134	5.832
29.4	13.71	14.948	1.286	12.134	4.32
34.3	16.092	17.315	1.484	12.135	3.661
39.2	18.469	19.819	1.693	12.16	3.525
44.1	21.008	22.068	1.891	12.158	2.461
49	23.448	24.385	2.088	12.157	1.96
53.9	25.862	26.744	2.293	12.156	1.677
58.8	28.3	29.126	2.492	12.156	1.439
63.7	30.752	31.432	2.692	12.155	1.094
68.6	33.164	33.786	2.891	12.159	0.929
73.5	35.531	36.179	3.096	12.159	0.904
78.4	39.413	37.243	3.226	12.152	2.83
83.3	40.43	40.9	3.495	12.165	0.578
88.2	42.902	43.215	3.694	12.153	0.364
93.1	45.338	45.569	3.898	12.152	0.255
98	47.754	47.876	4.096	12.155	0.128

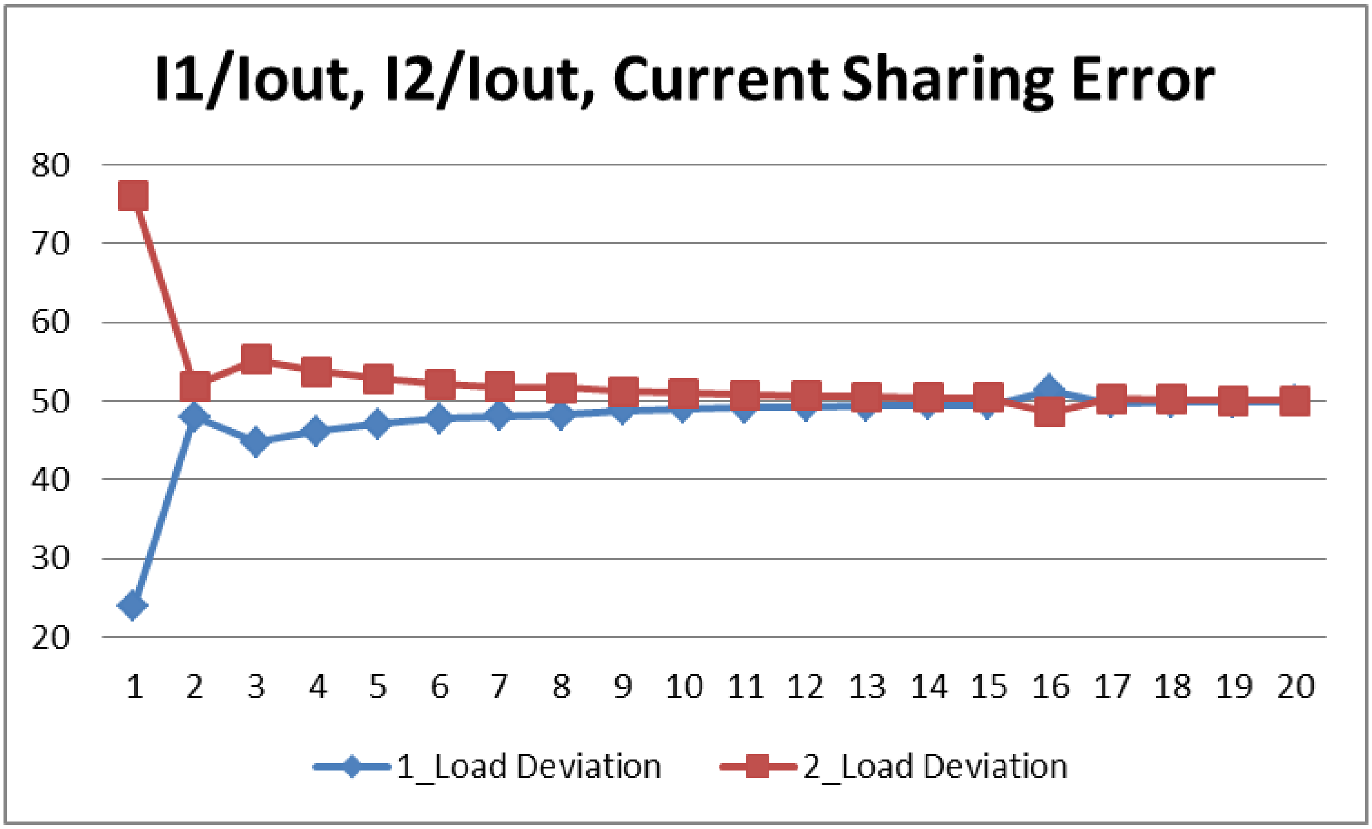

12V Current Distribution
60
50
40
30
20
10
0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
I1 (A)
I2 (A)

4.9.1 Forced Load Sharing





4.9.1 Forced Load Sharing



4.9.2 Load Sharing Signal

The PSUs share its load on the main outputs by using a single load share bus signal (12VLS) connected between the PSUs. If the load sharing is disabled by shorting the load share bus to ground, the power system continues operating within regulation limits for loads less than or equal to one PSU. A failure of a paralleled PSU does not affect the load sharing or output voltages of the other PSUs that are still operating. The PSUs are able to load share with up to 200mV of drop between the grounds of the different PSU outputs.

4.9.2.1 Load Sharing Signal Characteristics

The load share signal characteristics are only intended for the load sharing function under normal operation and not if Smart_ON is activated. The exact characteristics of the load share signal can be defined by the vendor. The delay from output voltages in regulation to load sharing active with maximum load of one PSU and four PSUs in parallel is ~~500ms~~ 100ms maximum.

Item	Description	Min	Nominal	Max
V_{share}; I_{out} = max	Voltage of load share bus at specified maximum output current	7.76V	8.0V	8.24V
$\Delta V_{share}/\Delta I_{out}$; I_{out} > 1A	Slope of load share bus voltage with changing load		$8.00/I_{max}$ [V/A]	
I_{share} sink; V_{share} = 4.00V	Amount of current the load share bus output from each PSU sinks.			0.5mA
I_{share} source; V_{share} = 4.00V	Amount of current the load share bus output from each PSU sources.	4mA		
T_{share}; I_{out} = maximum	Delay from output voltages in regulation to load sharing active with maximum load of one PSU and two PSUs in parallel.			100ms

Table 2: Load Share Signal Characteristics

4.9.2.1 Forced Load Sharing

Test conditions:

Sample NO. 1+1

AMB. 25℃

INPUT: 230V/50Hz

Load: +12Vsb/0A

Test Result: PASS

TEST ITEM		+12V Load (A)	Vshare Reading (V)					
			PS1		PS2		PS1 + PS2	
			O/P	Ibus	O/P	Ibus	O/P	Ibus
1	Vshare; Iout=min	0.0	12.262	0.537	12.27	0.537	12.27	0.537
2	Vshare; Iout=10% max	9.8	12.126	0.81	12.127	0.809	12.131	0.536
3	Vshare; Iout=20% max	19.6	12.123	1.606	12.119	1.604	12.134	0.889
4	Vshare; Iout=30% max	29.4	12.142	2.404	12.131	2.399	12.134	1.285
5	Vshare; Iout=40% max	39.2	12.153	3.208	12.112	3.202	12.158	1.701
6	Vshare; Iout=50% max	49.0	12.141	4.005	12.11	3.997	12.157	2.09
7	Vshare; Iout=60% max	58.8	12.119	4.803	12.08	4.793	12.156	2.49
8	Vshare; Iout=70% max	68.6	12.116	5.599	12.072	5.588	12.161	2.887
9	Vshare; Iout=80% max	78.4	12.111	6.403	12.061	6.389	12.152	3.233
10	Vshare; Iout=90% max	88.2	12.109	7.2	12.051	7.184	12.155	3.698
11	Vshare; Iout=max	98.0	12.105	7.996	12.041	7.979	12.157	4.092

5. Protection Circuits

Protection circuits inside the PSU cause only its main outputs to shut-down. The +12VSB output remains powered ON if the failure does not involve this output. When a protection circuit shuts down the PSU, the PWOK signal will go LOW, the bi-color LED will change from GREEN to solid AMBER. If the PSU latches off due to an output over-current, short circuit or output over-voltage protection circuit tripping, the PSU user has to apply an AC-reset (input power OFF/ON cycle of all paralleled PSUs for more than 15s) or a PSOFF-reset (PSOFF toggle) for more than 1s to reset the PSU and clear the latch.

.

5.1 Maximum Over Current Protection

Over current is a fault condition defined as a 10A/s current ramp starting from full load applied to the output under test. The other outputs may be set to any condition defined in section 0. If the output current exceeds the 150% of Imax threshold it may turn OFF after a period of time. When 12V current occur the over current protection and then the power supply will shut down after 50ms delay. If 12V current is over quick OCP level (higher than regular OCP), the shutdown delay time may be less then 50ms (within 10ms~50ms).

Table 12: Current protection

Vin Range	Pmax (W)	OCP Limits			
		12V		12VSB	
		Min	Max	Min	Max
90Vac – 132Vac	1000W	90.2A	123A	2.2A	4A
200Vac – 264Vac	1200W	107.8A	147A		

The current limits shown in the table will be satisfied throughout the entire operation. An over current on the +12VSB output will not latch OFF the power supply. It will return to normal operation once the fault is removed Any over load condition except the +12VSB will cause the PWOK signal to go LOW, the bi-color LED will change from GREEN to AMBER.

.

5.1 Maximum Over Current Protection

Test conditions:

Sample NO.1

Vin : 90Vac/47Hz, 264Vac/63Hz

O/P Load : Max Load

AMB : 0°C, 25℃, 50°C

Numerical Result: PASS

AC Condition	Output Name	OCP Test Reading (A)			SPEC
		0°C	25°C	50°C	
90Vac/47Hz	12V	93	93	93	90.2A ~ 123A
	12Vsb	3.5	3.45	3.40	2.2A ~ 4A
264Vac/63Hz	12V	111	111	111	107A ~ 147A
	12Vsb	3.5	3.45	3.40	2.2A ~ 4A

※ ATS TEST

5.1 Maximum Over Current Protection

Test conditions:

Sample NO.1

AMB. 25℃

INPUT: 180Vac/60Hz

Output Load: +12V/98A, +12Vsb/0A

STEP1: AC I/P = 90VAC/60Hz, +12VSB@ 1A, +12V@ **82.0A**.

STEP2: PSON.

STEP3: AC I/P = 90VAC/60Hz, +12VSB@ 1A, +12V@ **94.5A (PSU set at 92.6A)**

STEP4: The LED should be solid amber and PSU shutdown. The SMBxAlert is Low.

STEP5: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	51/48h
2	STATUS_IOUT	7Bh	A0h

STEP6: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_IOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	51/48h
2	STATUS_IOUT	7Bh	A0h

STEP7: Use Send Byte(Command 1) to send CLEAR_FAULT to clear no-paged status.

STEP8: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT and STATUS_WORD. The SMBAlert is Low.

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/08h
2	STATUS_IOUT	7Bh	00h

STEP9: Use **PAGE_PLUS_WRITE (Command 6) to clear STATUS_IOUT of PAGE 00 and PAGE 01**

STEP10: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_IOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/08h
2	STATUS_IOUT	7Bh	00h

5.1 Maximum Over Current Protection

Test conditions:

Sample NO.1

AMB. 25℃

INPUT: 180Vac/60Hz

Output Load: +12V/98A, +12Vsb/0A

STEP1: AC I/P = 90VAC/60Hz, +12VSB@ 1A, +12V@ **82.0A**.

STEP2: PSON.

STEP3: AC I/P = 90VAC/60Hz, +12VSB@ 1A, +12V@ **94.5A (PSU set at 92.6A)**

STEP4: The LED should be solid amber and PSU shutdown. The SMBxAlert is Low.

STEP5: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	51/48h
2	STATUS_IOUT	7Bh	A0h

STEP6: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_IOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	51/48h
2	STATUS_IOUT	7Bh	A0h

STEP7: Use Send Byte(Command 1) to send CLEAR_FAULT to clear no-paged status.

STEP8: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT and STATUS_WORD. The SMBAlert is Low.

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/08h
2	STATUS_IOUT	7Bh	00h

STEP9: Use **PAGE_PLUS_WRITE (Command 6) to clear STATUS_IOUT of PAGE 00 and PAGE 01**

STEP10: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_IOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/08h
2	STATUS_IOUT	7Bh	00h

5.1 Maximum Over Current Protection

Test conditions:

Sample NO.1

AMB. 25℃

INPUT: 180Vac/60Hz

Output Load: +12V/36.33A, +12Vsb/1A

STEP1: AC I/P = 90VAC/60Hz, +12VSB@ 1A, +12V@ **82.0A**.

STEP2: PSON.

STEP3: AC I/P = 90VAC/60Hz, +12VSB@ 1A, +12V@ **94.5A (PSU set at 92.6A)**

STEP4: The LED should be solid amber and PSU shutdown. The SMBxAlert is Low.

STEP5: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT and STATUS_WORD

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	51/48h
2	STATUS_IOUT	7Bh	A0h

STEP6: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_IOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	51/48h
2	STATUS_IOUT	7Bh	A0h

STEP7: Use Send Byte(Command 1) to send CLEAR_FAULT to clear no-paged status.

STEP8: Use Read Byte(Command 3) and Read Word(Command 5) to read STATUS_IOUT and STATUS_WORD. The SMBAlert is Low.

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/08h
2	STATUS_IOUT	7Bh	00h

STEP9: Use **PAGE_PLUS_WRITE (Command 6) to clear STATUS_IOUT of PAGE 00 and PAGE 01**

STEP10: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_IOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/08h
2	STATUS_IOUT	7Bh	00h

5.1 Maximum Over Current Protection

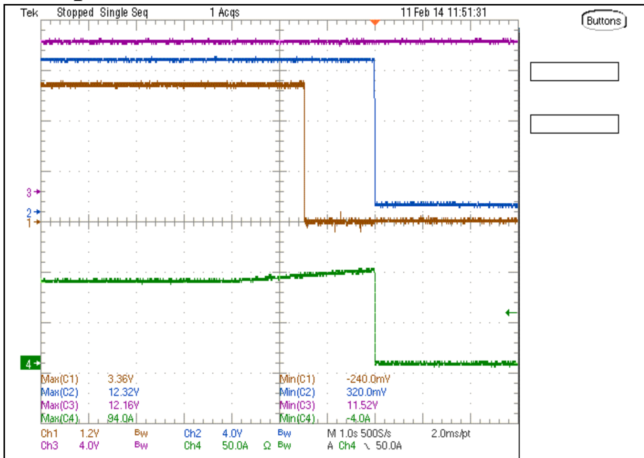
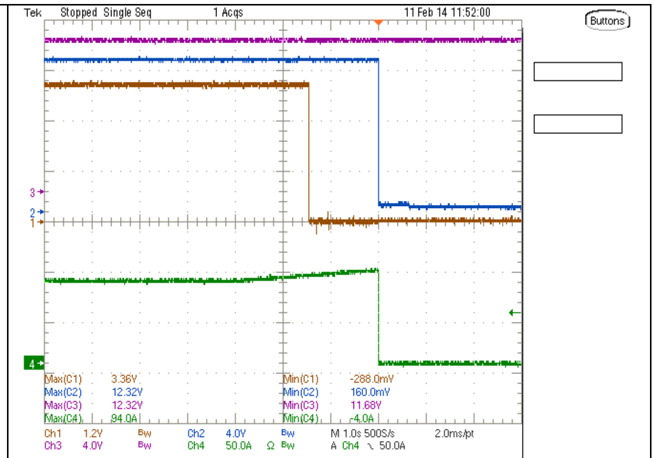
Test conditions:

Sample NO.1

AMB. 25℃

OCP Test Condition	OCP Max (A)	OCP Min (A)	OLP Trip	Result
+12V. OCP; I/P: 90Vac,+12Vsb: Max load	123.000	90.200	93.000	PASS
+12V. OCP; I/P: 90Vac,+12Vsb: Min load	123.000	90.200	93.000	PASS

Graphical Result: PASS

	
+12V. OCP; I/P: 90Vac,+12Vsb: Max load (1) Alert (2) 12V (3) 12Vsb (4) 12V Current	+12V. OCP; I/P: 90Vac,+12Vsb: Min load (1) Alert (2) 12V (3) 12Vsb (4) 12V Current

5.1 Maximum Over Current Protection

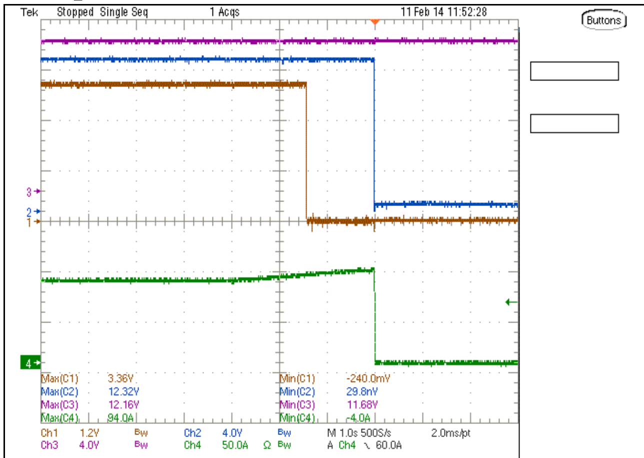
Test conditions:

Sample NO.1

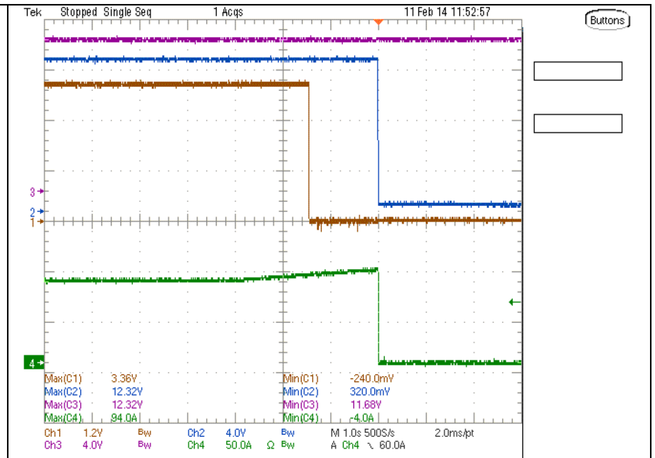
AMB. 25℃

OCP Test Condition	OCP Max (A)	OCP Min (A)	OLP Trip	Result
+12V. OCP; I/P: 100Vac,+12Vsb: Max load	123.000	90.200	93.000	PASS
+12V. OCP; I/P: 100Vac,+12Vsb: Min load	123.000	90.200	93.000	PASS

Graphical Result: PASS



+12V. OCP; I/P: 100Vac,+12Vsb: Max load
(1) Alert
(2) 12V
(3) 12Vsb
(4) 12V Current



+12V. OCP; I/P: 100Vac,+12Vsb: Min load
(1) Alert
(2) 12V
(3) 12Vsb
(4) 12V Current

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/68h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	80h

5.1 Maximum Over Current Protection

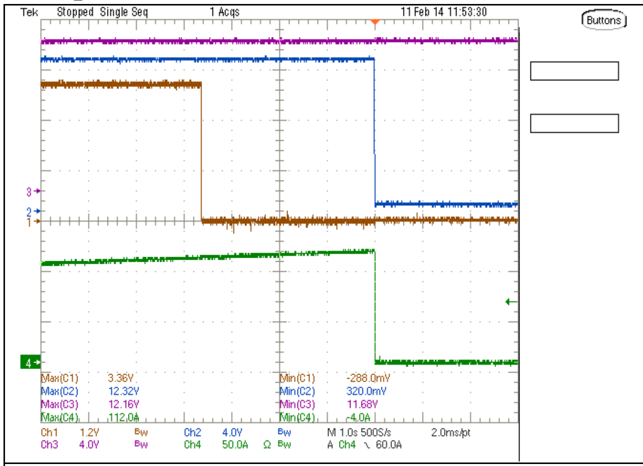
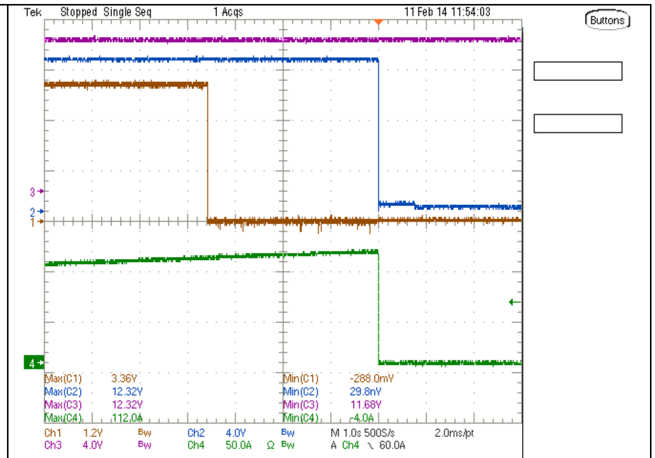
Test conditions:

Sample NO.1

AMB. 25℃

OCP Test Condition	OCP Max (A)	OCP Min (A)	OLP Trip	Result
+12V. OCP; I/P: 180Vac,+12Vsb: Max load	147.000	107.800	110.400	PASS
+12V. OCP; I/P: 180Vac,+12Vsb: Min load	147.000	107.800	110.400	PASS

Graphical Result: PASS

	
+12V. OCP; I/P: 200Vac,+12Vsb: Max load (1) Alert (2) 12V (3) 12Vsb (4) 12V Current	+12V. OCP; I/P: 200Vac,+12Vsb: Min load (1) Alert (2) 12V (3) 12Vsb (4) 12V Current

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/48h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	A1h

5.1 Maximum Over Current Protection

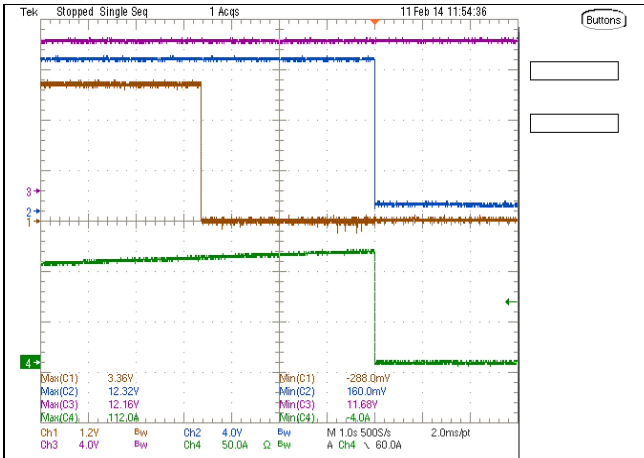
Test conditions:

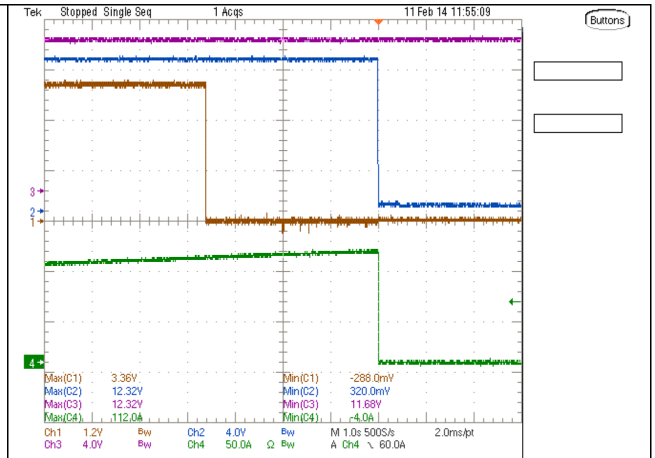
Sample NO.1

AMB. 25℃

OCP Test Condition	OCP Max (A)	OCP Min (A)	OLP Trip	Result
+12V. OCP; I/P: 264Vac,+12Vsb: Max load	147.000	107.800	109.200	PASS
+12V. OCP; I/P: 264Vac,+12Vsb: Min load	147.000	107.800	109.200	PASS

Graphical Result: PASS





+12V. OCP; I/P: 264Vac,+12Vsb: Max load (1) Alert (2) 12V (3) 12Vsb (4) 12V Current	+12V. OCP; I/P: 264Vac,+12Vsb: Min load (1) Alert (2) 12V (3) 12Vsb (4) 12V Current

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/48h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	A1h

5.1 Maximum Over Current Protection

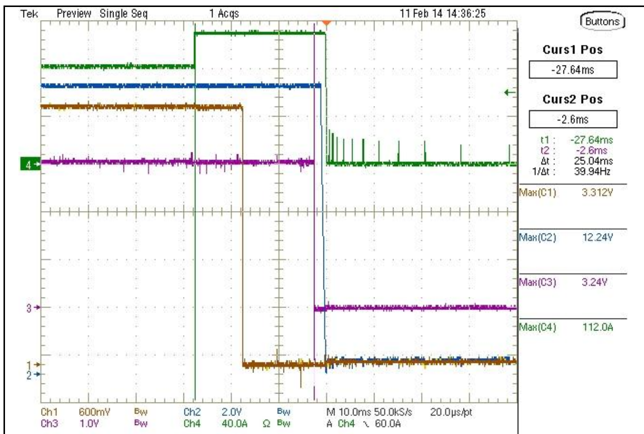
Test conditions:

Sample NO.1

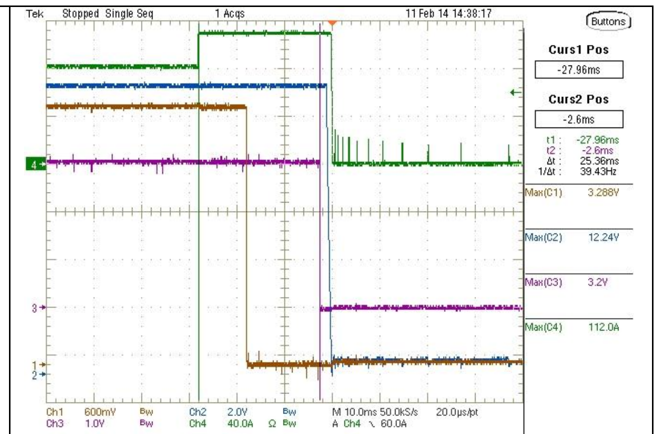
AMB. 25℃

Graphical Result: PASS

Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
+12V OCP Delay Time 90Vac; +12Vsb: Max load	50.00	*	25.04	PASS
+12V OCP Delay Time 90Vac; +12Vsb: Min load	50.00	*	25.36	PASS



+12V OCP Delay Time 90Vac; +12Vsb: Max load
CH1: Alert
CH2: +12V
CH3: PWOK
CH4: +12V Current



+12V OCP Delay Time 90Vac; +12Vsb: Min load
CH1: Alert
CH2: +12V
CH3: PWOK
CH4: +12V Current

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/48h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	80h

5.1 Maximum Over Current Protection

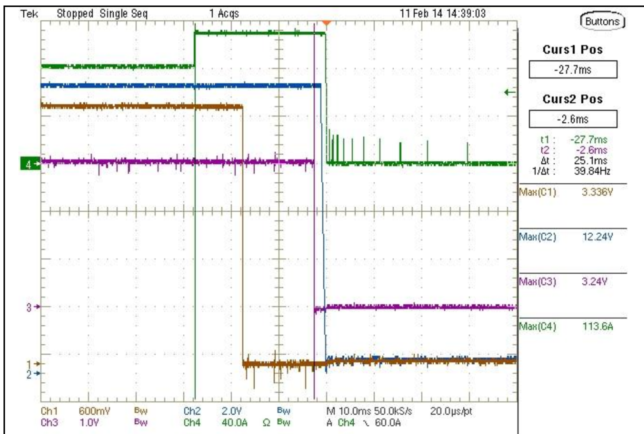
Test conditions:

Sample NO.1

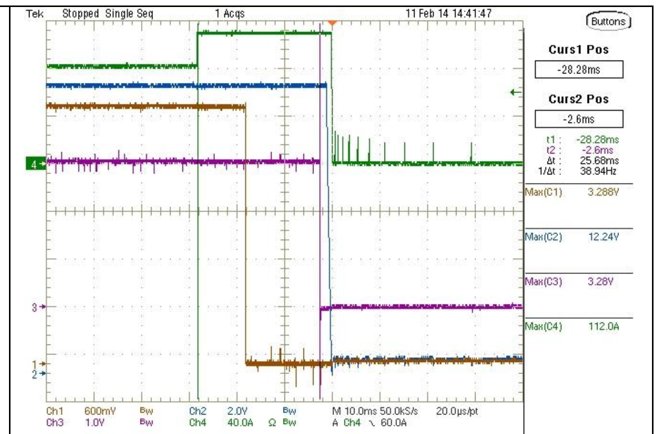
AMB. 25℃

Graphical Result: PASS

Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
+12V OCP Delay Time 100Vac +12Vsb Max load	50.00	*	25.10	PASS
+12V OCP Delay Time 100Vac +12Vsb Min load	50.00	*	25.68	PASS



+12V OCP Delay Time 100Vac +12Vsb Max load
CH1: Alert
CH2: +12V
CH3: PWOK
CH4: +12V Current



+12V OCP Delay Time 100Vac +12Vsb Min load
CH1: Alert
CH2: +12V
CH3: PWOK
CH4: +12V Current

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/48h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	A0h

5.1 Maximum Over Current Protection

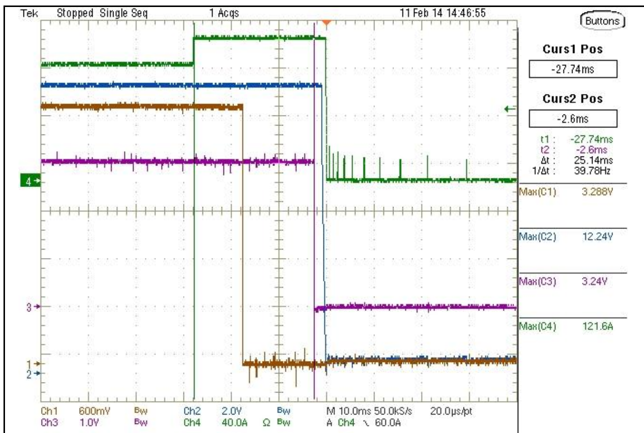
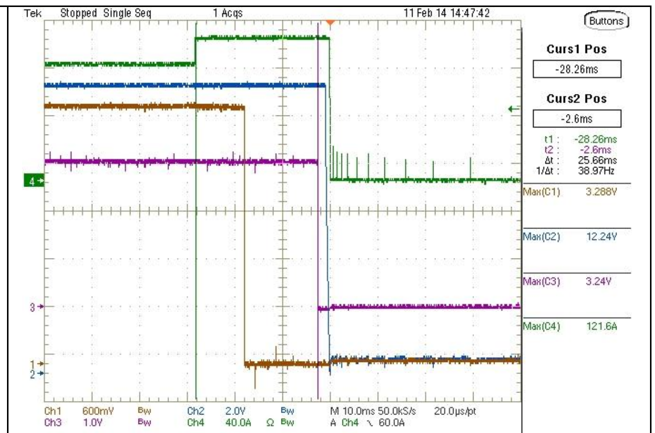
Test conditions:

Sample NO.1

AMB. 25℃

Graphical Result: PASS

Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
+12V OCP Delay Time 200Vac +12Vsb Max load	50.00	*	25.14	PASS
+12V OCP Delay Time 200Vac +12Vsb Min load	50.00	*	25.66	PASS

	
+12V OCP Delay Time 200Vac +12Vsb Max load CH1: Alert CH2: +12V CH3: PWOK CH4: +12V Current	+12V OCP Delay Time 200Vac +12Vsb Min load CH1: Alert CH2: +12V CH3: PWOK CH4: +12V Current

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/48h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	A1h

5.1 Maximum Over Current Protection

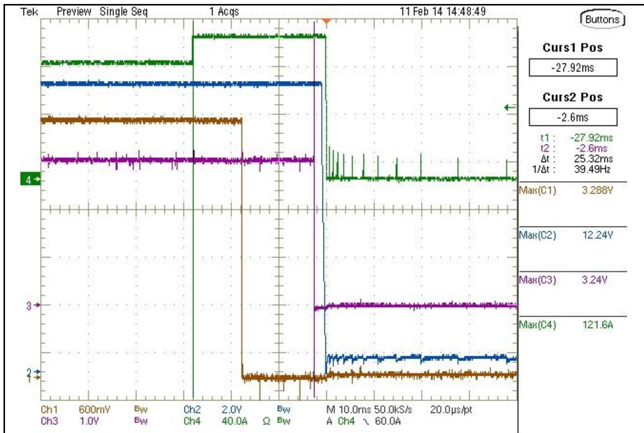
Test conditions:

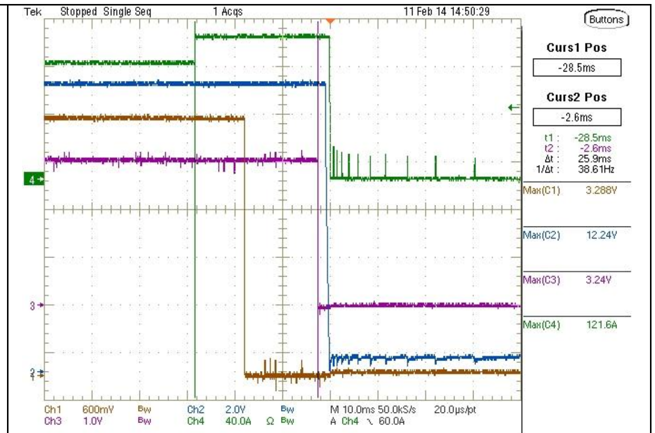
Sample NO.1

AMB. 25℃

Graphical Result: PASS

Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
+12V OCP Delay Time 264Vac +12Vsb Max load	50.00	*	25.32	PASS
+12V OCP Delay Time 264Vac +12Vsb Min load	50.00	*	25.90	PASS





+12V OCP Delay Time 264Vac +12Vsb Max load CH1: Alert CH2: +12V CH3: PWOK CH4: +12V Current	+12V OCP Delay Time 264Vac +12Vsb Min load CH1: Alert CH2: +12V CH3: PWOK CH4: +12V Current

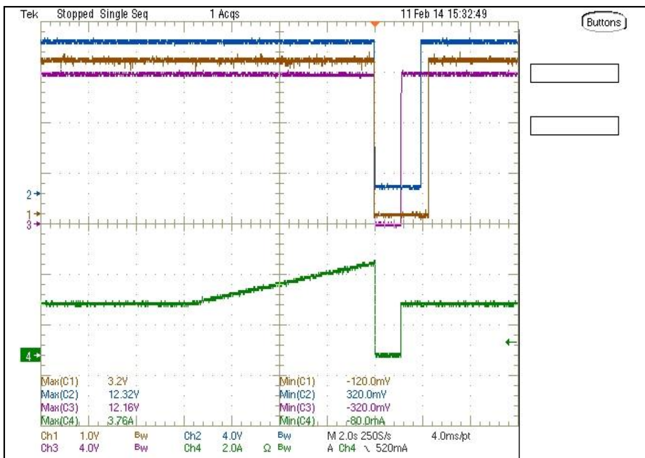
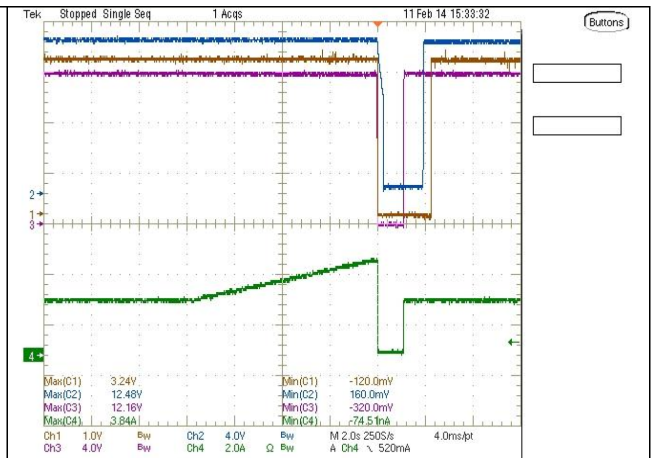
Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

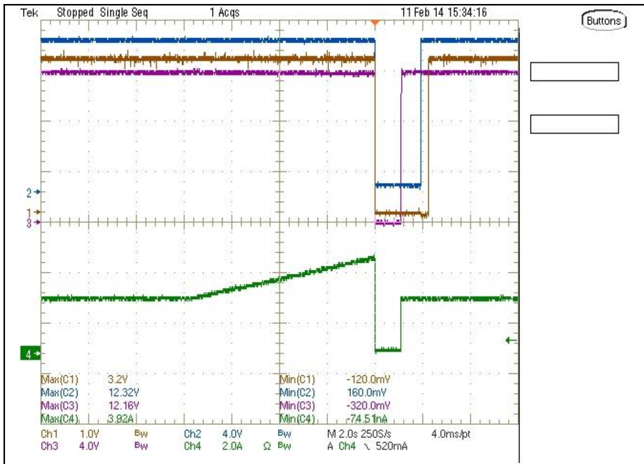
NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/48h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	A1h

5.1 Maximum Over Current Protection

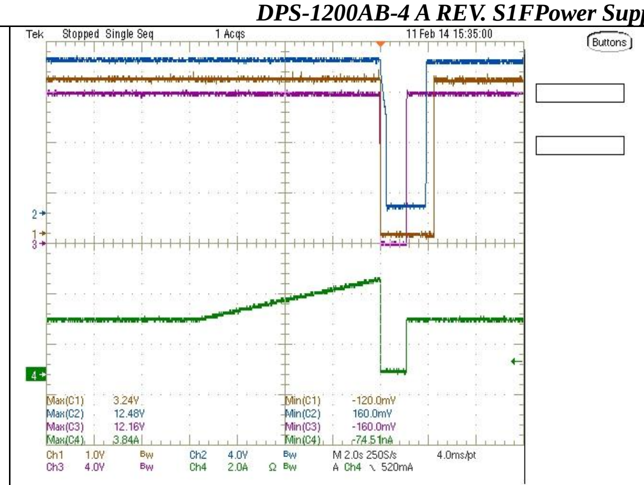
Test conditions:
Sample NO.1
AMB. 25℃
Graphical Result: PASS

OCP Test Condition	OCP Max (A)	OCP Min (A)	OLP Trip	Result
+12Vsb. OCP; I/P: 90Vac,+12V: Max load	4.00	2.20	3.600	PASS
+12Vsb. OCP; I/P: 90Vac,+12V: Min load	4.00	2.20	3.600	PASS
+12Vsb. OCP; I/P: 100Vac,+12V: Max load	4.00	2.20	3.600	PASS
+12Vsb. OCP; I/P: 100Vac,+12V: Min load	4.00	2.20	3.600	PASS
+12Vsb. OCP; I/P: 200Vac,+12V: Max load	4.00	2.20	3.600	PASS
+12Vsb. OCP; I/P: 200Vac,+12V: Min load	4.00	2.20	3.600	PASS
+12Vsb. OCP; I/P: 264Vac,+12V: Max load	4.00	2.20	3.600	PASS
+12Vsb. OCP; I/P: 264Vac,+12V: Min load	4.00	2.20	3.600	PASS

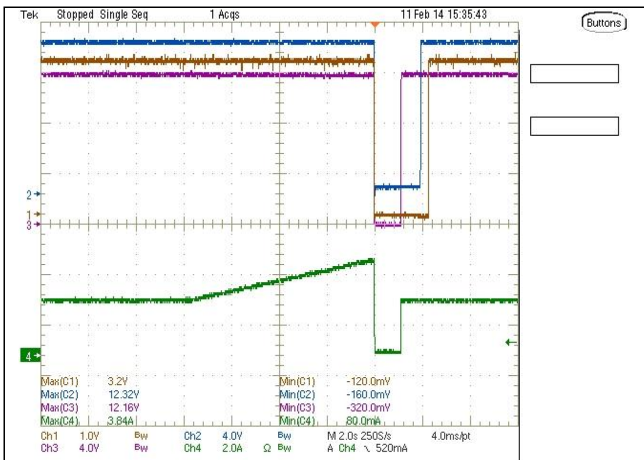
	
+12Vsb. OCP; I/P: 90Vac,+12V: Max load (1) Alert (2) 12V (3) 12Vsb (4) 12Vsb Current	+12Vsb. OCP; I/P: 90Vac,+12V: Min load (1) Alert (2) 12V (3) 12Vsb (4) 12Vsb Current



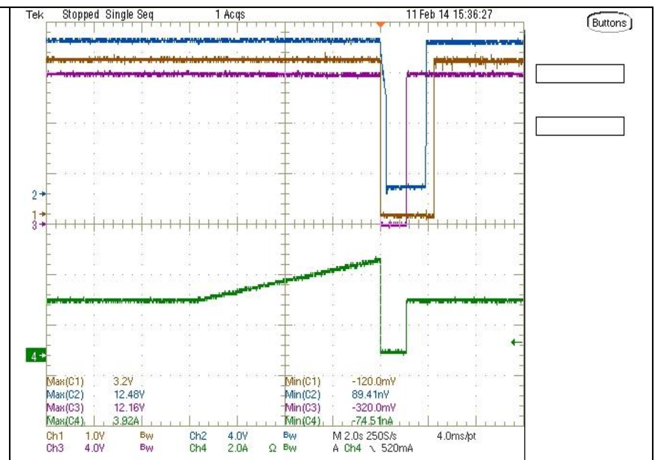
+12Vsb. OCP; I/P: 100Vac,+12V: Max load
(1) Alert
(2) 12V
(3) 12Vsb
(4) 12Vsb Current



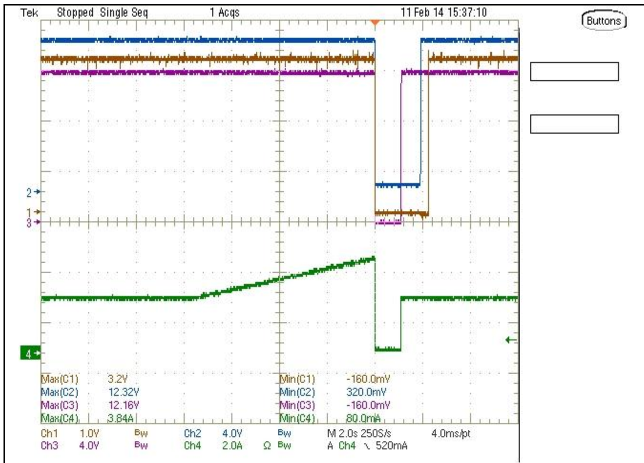
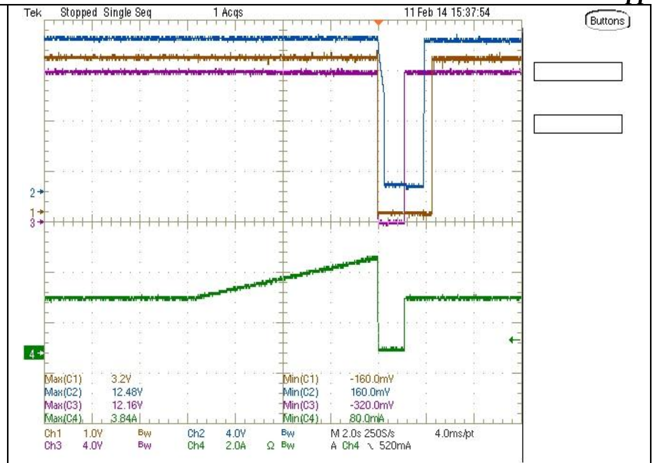
+12Vsb. OCP; I/P: 100Vac,+12V: Min load
(1) Alert
(2) 12V
(3) 12Vsb
(4) 12Vsb Current



+12Vsb. OCP; I/P: 200Vac,+12V: Max load
(1) Alert
(2) 12V
(3) 12Vsb
(4) 12Vsb Current



+12Vsb. OCP; I/P: 200Vac,+12V: Min load
(1) Alert
(2) 12V
(3) 12Vsb
(4) 12Vsb Current

	
+12Vsb. OCP; I/P: 264Vac,+12V: Max load (1) Alert (2) 12V (3) 12Vsb (4) 12Vsb Current	+12Vsb. OCP; I/P: 264Vac,+12V: Min load (1) Alert (2) 12V (3) 12Vsb (4) 12Vsb Current

5.2 Short Circuit Protection

A short circuit (impedance <0.1 ohms) applied to any output during start-up or while running will not cause any damage to the power supply. The power supply shuts down and latches OFF for short on main outputs but recovers upon PSON assertion or a PMBus initiated ON/OFF cycle command or AC toggle. The +12VSB is capable of being shorted indefinitely, and all outputs shuts down upon a short circuit of the +12VSB and when the short is removed the power supply shall recover automatically.

5.2 Short Circuit Protection

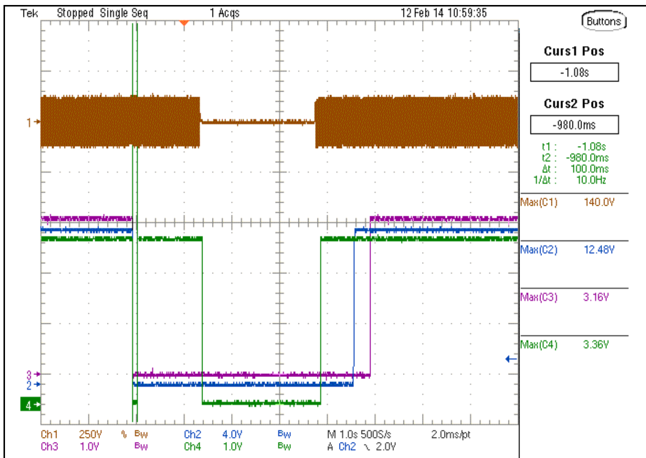
Test conditions:

Sample NO.1

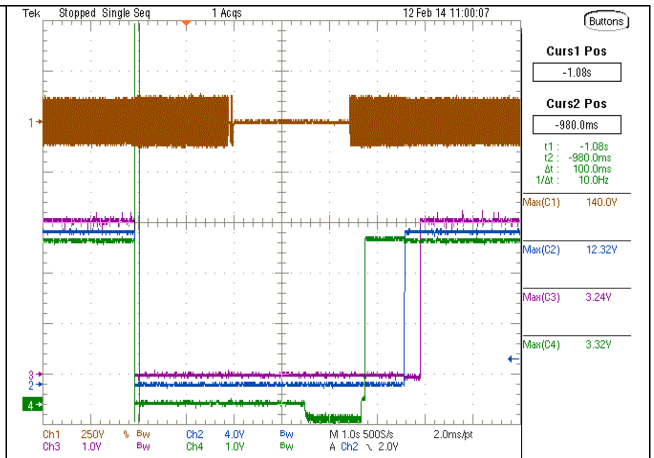
AMB. 25℃

Graphical Result: PASS

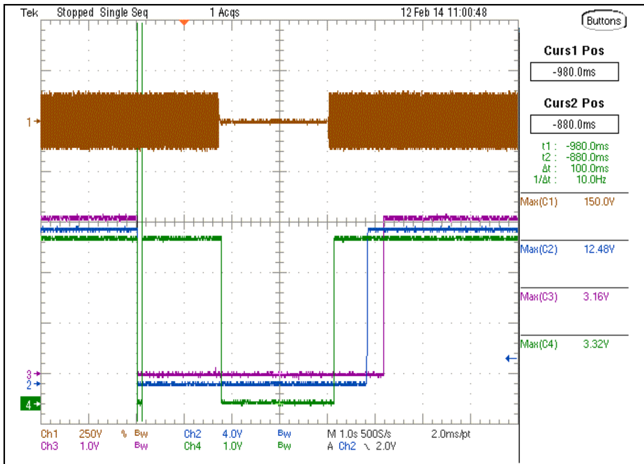
Test Condition	Cursor Reading(mS)	Result
+12V Short; Turn on Then O/P short; I/P:90Vac,O/P:Min load	100.0	PASS
+12V Short; Turn on Then O/P short; I/P:90Vac,O/P:Max load	100.0	PASS
+12V Short; Turn on Then O/P short; I/P:100Vac,O/P:Min load	100.0	PASS
+12V Short; Turn on Then O/P short; I/P:100Vac,O/P:Max load	100.0	PASS
+12V Short; Turn on Then O/P short; I/P:200Vac,O/P:Min load	100.0	PASS
+12V Short; Turn on Then O/P short; I/P:200Vac,O/P:Max load	100.0	PASS
+12V Short; Turn on Then O/P short; I/P:264Vac,O/P:Min load	100.0	PASS
+12V Short; Turn on Then O/P short; I/P:264Vac,O/P:Max load	100.0	PASS



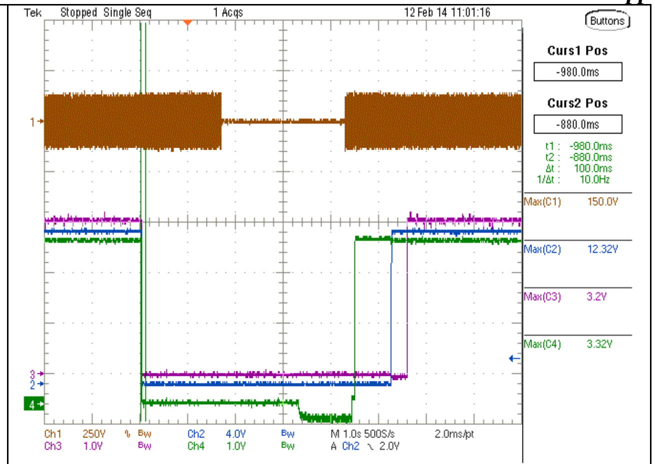
+12V Short; Turn on Then O/P short;
I/P:90Vac,O/P:Min load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



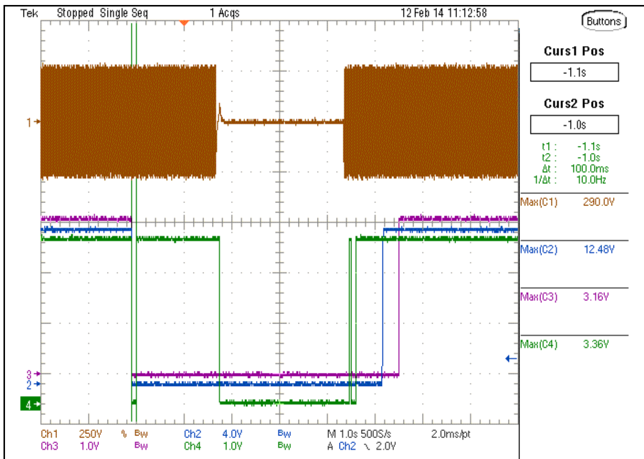
+12V Short; Turn on Then O/P short;
I/P:90Vac,O/P:Max load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



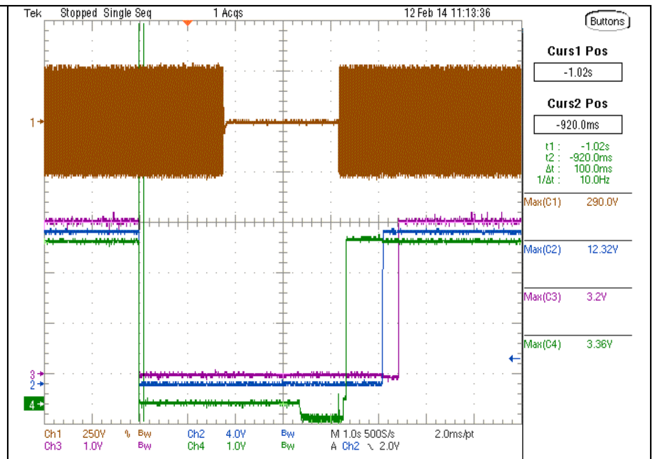
+12V Short; Turn on Then O/P short;
I/P:100Vac,O/P:Min load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



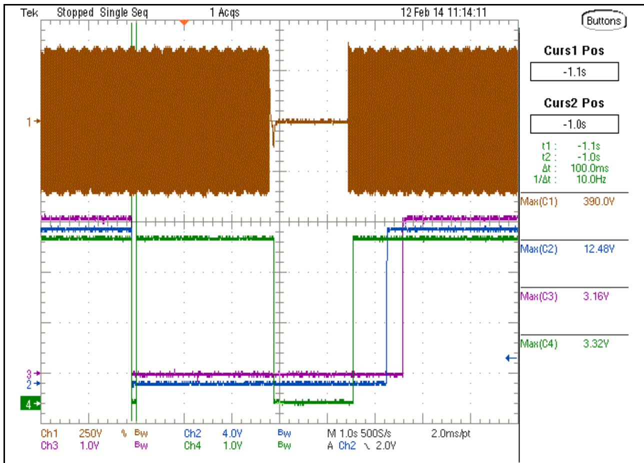
+12V Short; Turn on Then O/P short;
I/P:100Vac,O/P:Max load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



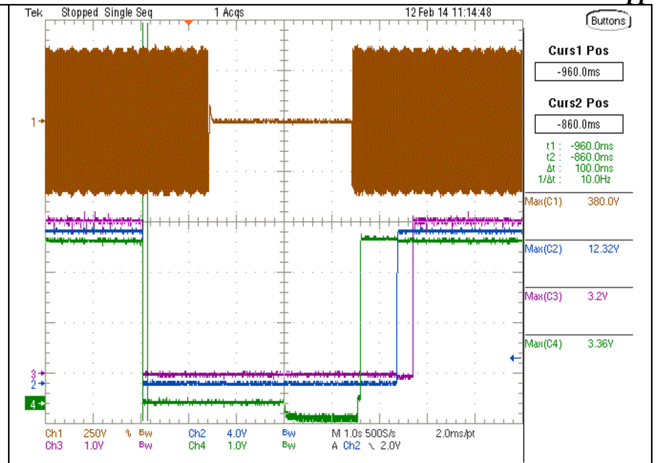
+12V Short; Turn on Then O/P short;
I/P:200Vac,O/P:Min load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; Turn on Then O/P short;
I/P:200Vac,O/P:Max load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; Turn on Then O/P short;
I/P:264Vac,O/P:Min load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; Turn on Then O/P short;
I/P:264Vac,O/P:Max load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/48h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	A0h

5.2 Short Circuit Protection

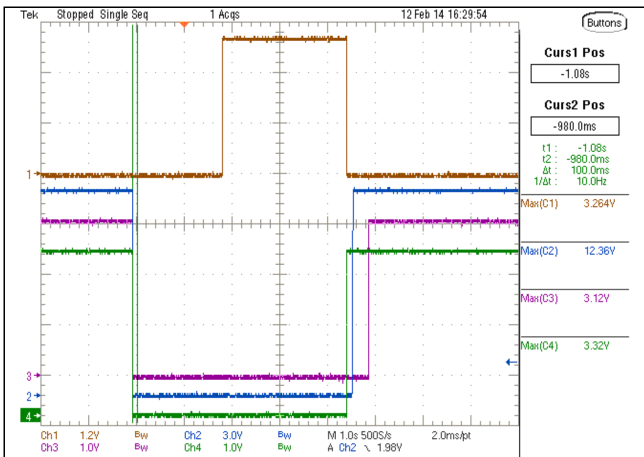
Test conditions:

Sample NO.1

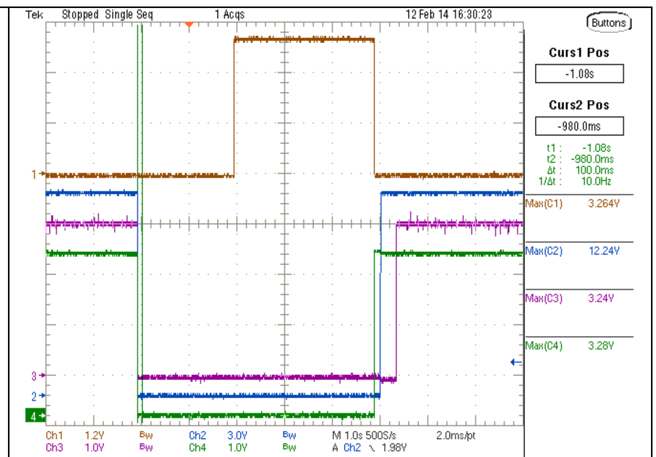
AMB. 25℃

Graphical Result: PASS

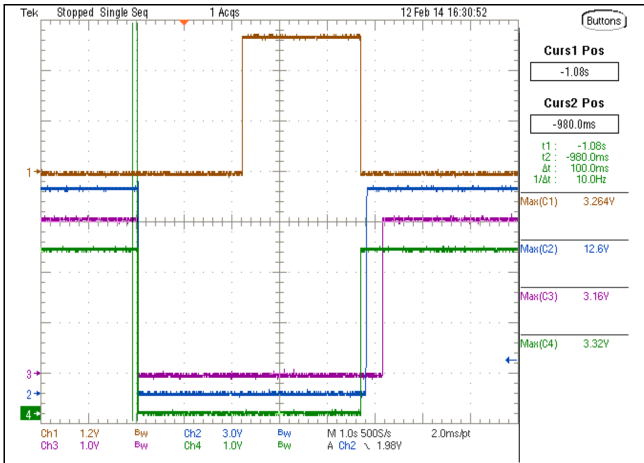
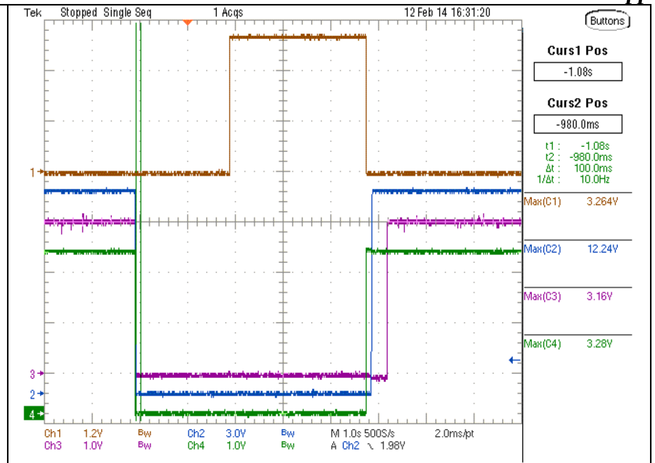
Test Condition	Cursor Reading	Result
+12V Short; Turn on Then O/P short; I/P:90Vac,O/P:Min load by PSON#	0.100	PASS
+12V Short; Turn on Then O/P short; I/P:90Vac,O/P:Max load by PSON#	0.100	PASS
+12V Short; Turn on Then O/P short; I/P:100Vac,O/P:Min load by PSON#	0.100	PASS
+12V Short; Turn on Then O/P short; I/P:100Vac,O/P:Max load by PSON#	0.100	PASS
+12V Short; Turn on Then O/P short; I/P:200Vac,O/P:Min load by PSON#	0.100	PASS
+12V Short; Turn on Then O/P short; I/P:200Vac,O/P:Max load by PSON#	0.100	PASS
+12V Short; Turn on Then O/P short; I/P:264Vac,O/P:Min load by PSON#	0.100	PASS
+12V Short; Turn on Then O/P short; I/P:264Vac,O/P:Max load by PSON#	0.100	PASS

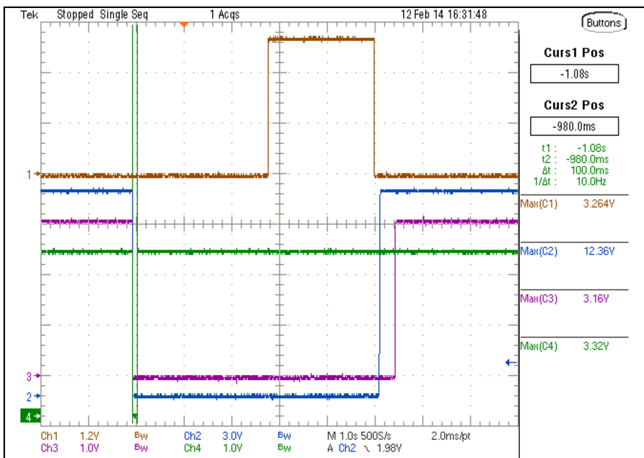
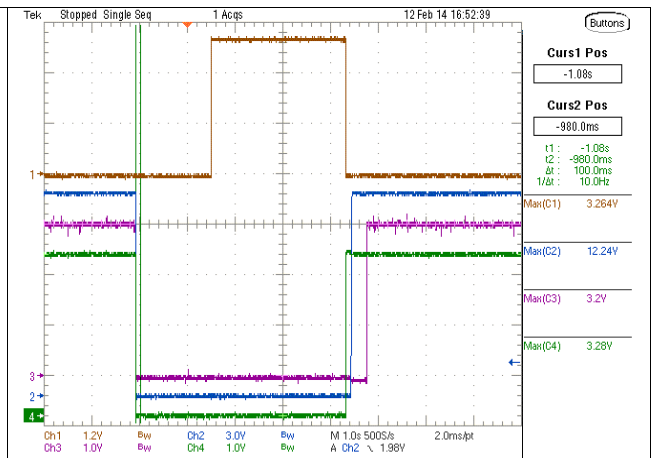


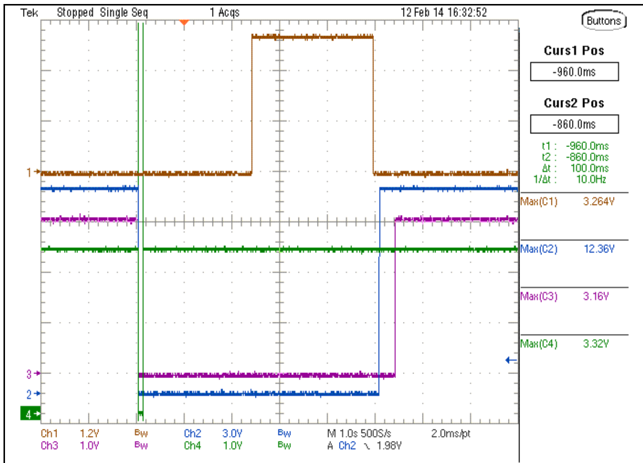
+12V Short; Turn on Then O/P short;
I/P:90Vac,O/P:Min load by PSON#
CH1: PSON
CH2: +12V
CH3: PWOK
CH4: SMB Alert

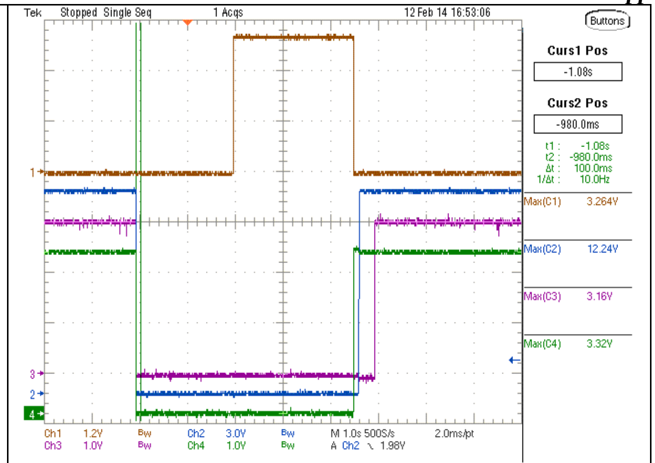


+12V Short; Turn on Then O/P short;
I/P:90Vac,O/P:Max load by PSON#
CH1: PSON
CH2: +12V
CH3: PWOK
CH4: SMB Alert

	
+12V Short; Turn on Then O/P short; I/P:100Vac,O/P:Min load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert	+12V Short; Turn on Then O/P short; I/P:100Vac,O/P:Max load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert

	
+12V Short; Turn on Then O/P short; I/P:200Vac,O/P:Min load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert	+12V Short; Turn on Then O/P short; I/P:200Vac,O/P:Max load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert





+12V Short; Turn on Then O/P short; I/P:264Vac,O/P:Min load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert	+12V Short; Turn on Then O/P short; I/P:264Vac,O/P:Max load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/48h
2	STATUS_VOUT	7Ah	00h
3	STATUS_IOUT	7Bh	A0h

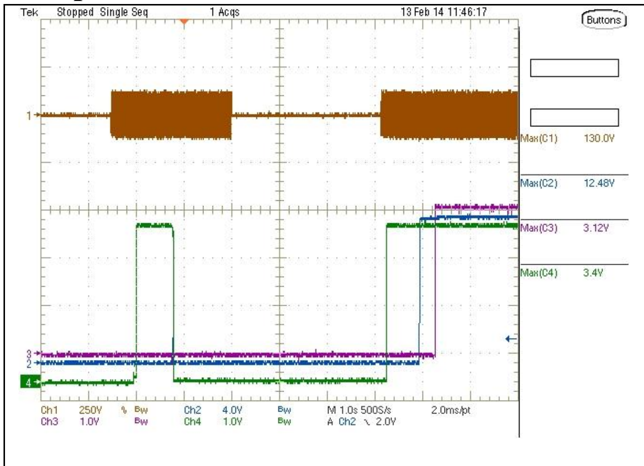
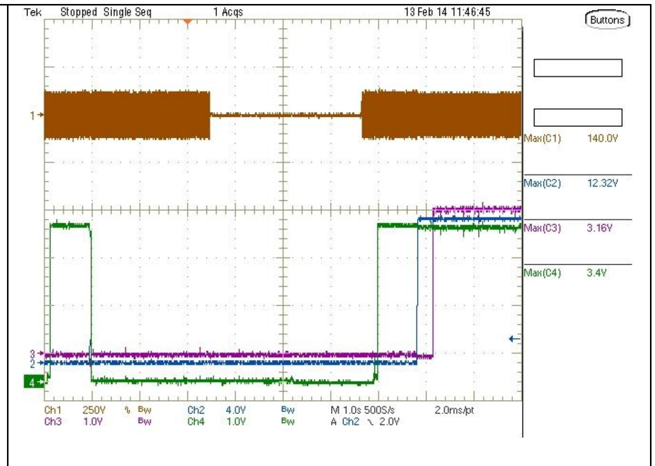
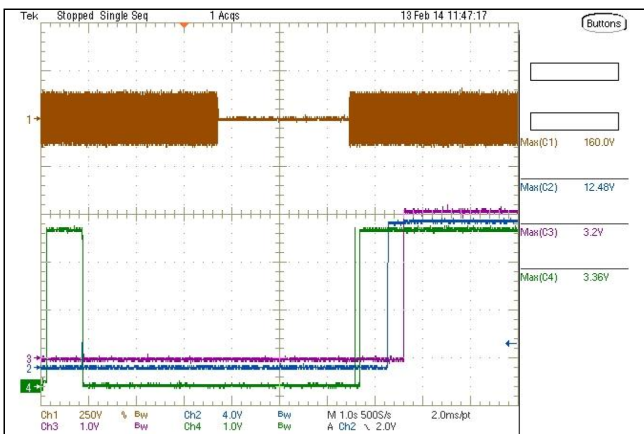
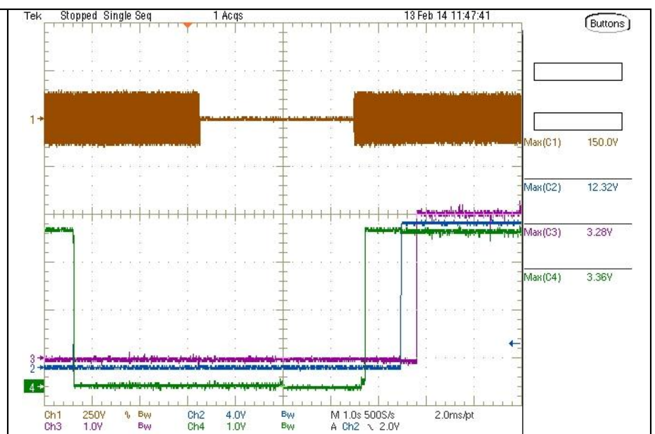
5.2 Short Circuit Protection

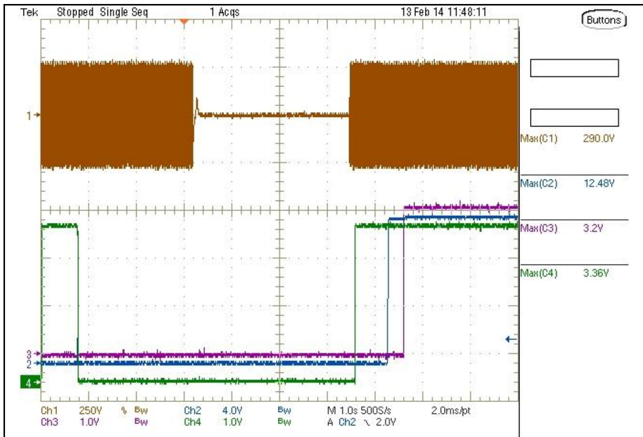
Test conditions:

Sample NO.1

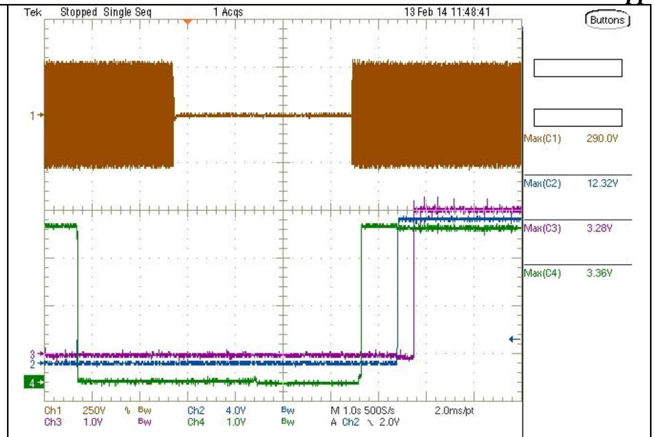
AMB. 25℃

Graphical Result: PASS

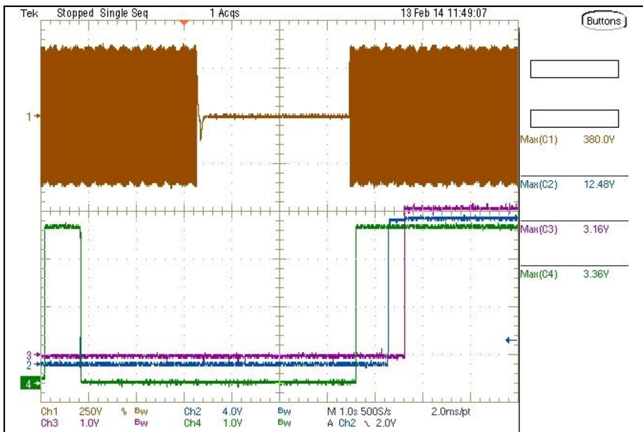
 	
+12V Short; O/P short Then Turn on ; I/P:90Vac,O/P:Min load CH1: AC I/P by AC off/on CH2: +12V CH3: PWOK CH4: SMB Alert	+12V Short; O/P short Then Turn on ; I/P:90Vac,O/P:Max load CH1: AC I/P by AC off/on CH2: +12V CH3: PWOK CH4: SMB Alert
 	
+12V Short; O/P short Then Turn on ; I/P:100Vac,O/P:Min load CH1: AC I/P by AC off/on CH2: +12V CH3: PWOK CH4: SMB Alert	+12V Short; O/P short Then Turn on ; I/P:100Vac,O/P:Max load CH1: AC I/P by AC off/on CH2: +12V CH3: PWOK CH4: SMB Alert



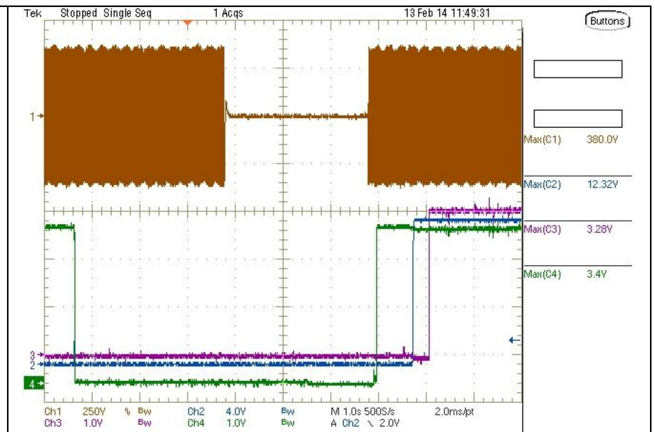
+12V Short; O/P short Then Turn on ;
I/P:200Vac,O/P:Min load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; O/P short Then Turn on ;
I/P:200Vac,O/P:Max load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; O/P short Then Turn on ;
I/P:264Vac,O/P:Min load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; O/P short Then Turn on ;
I/P:264Vac,O/P:Max load
CH1: AC I/P by AC off/on
CH2: +12V
CH3: PWOK
CH4: SMB Alert

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/C8h
2	STATUS_VOUT	7Ah	10h
3	STATUS_IOUT	7Bh	A0h

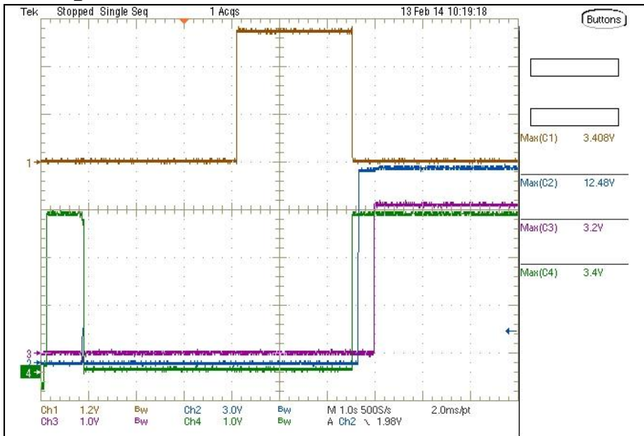
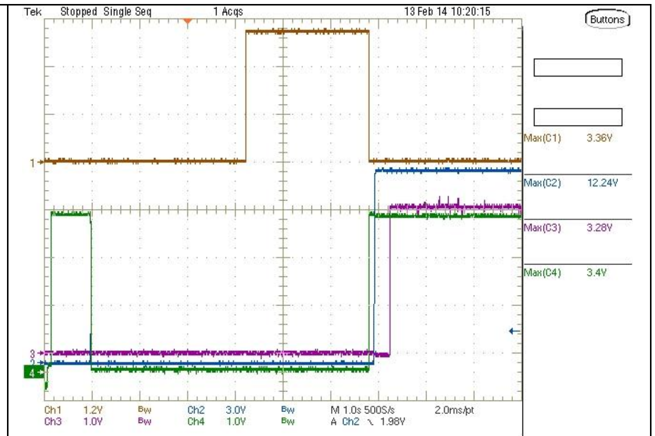
5.2 Short Circuit Protection

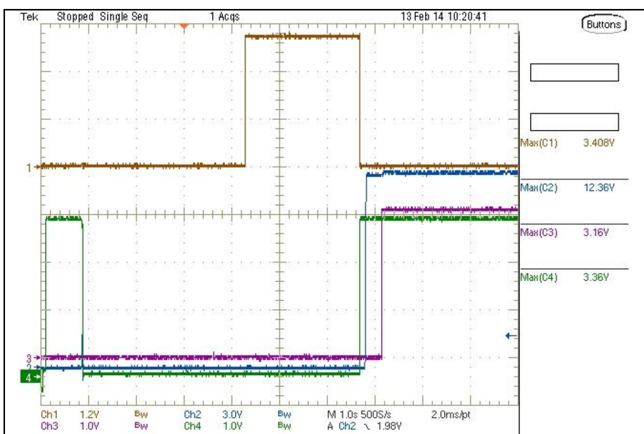
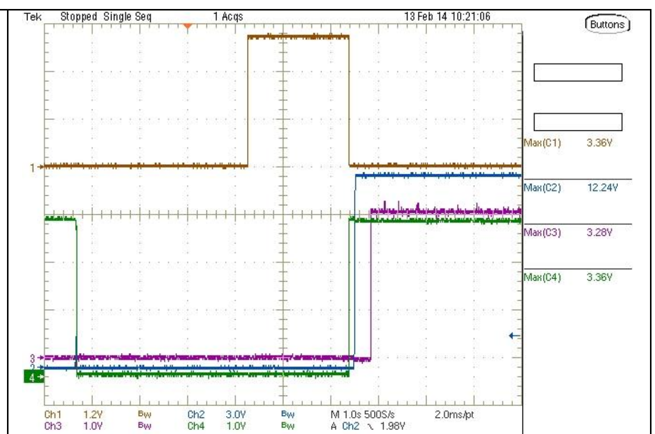
Test conditions:

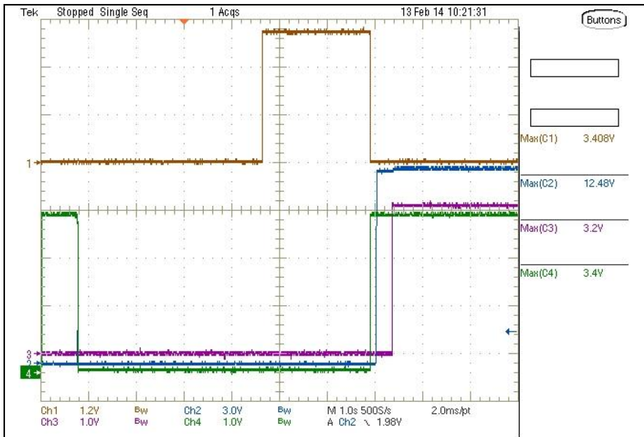
Sample NO.1

AMB. 25℃

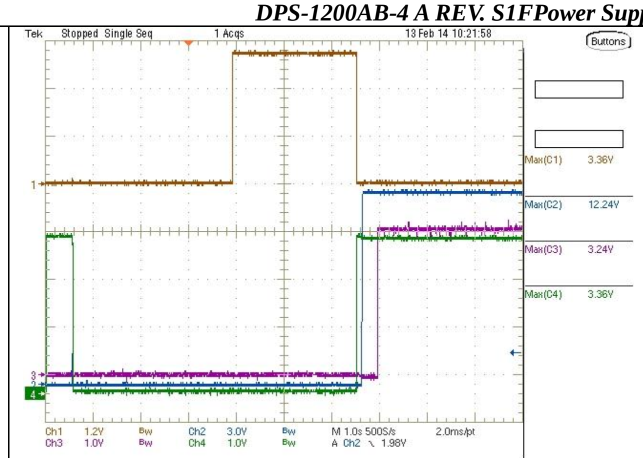
Graphical Result: PASS

	
+12V Short; O/P short Then Turn on ; I/P:90Vac,O/P:Min load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert	+12V Short; O/P short Then Turn on ; I/P:90Vac,O/P:Max load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert

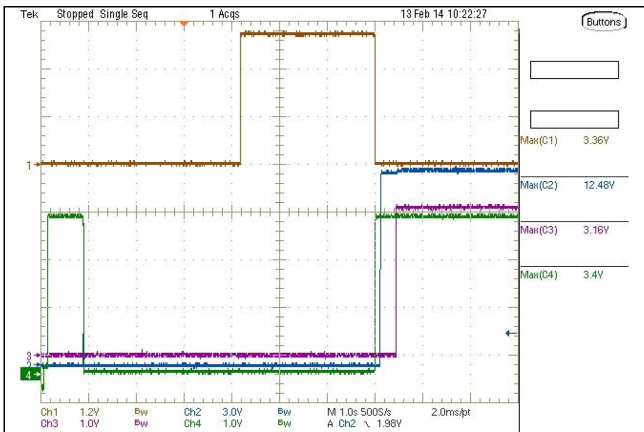
	
+12V Short; O/P short Then Turn on ; I/P:100Vac,O/P:Min load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert	+12V Short; O/P short Then Turn on ; I/P:100Vac,O/P:Max load by PSON# CH1: PSON CH2: +12V CH3: PWOK CH4: SMB Alert



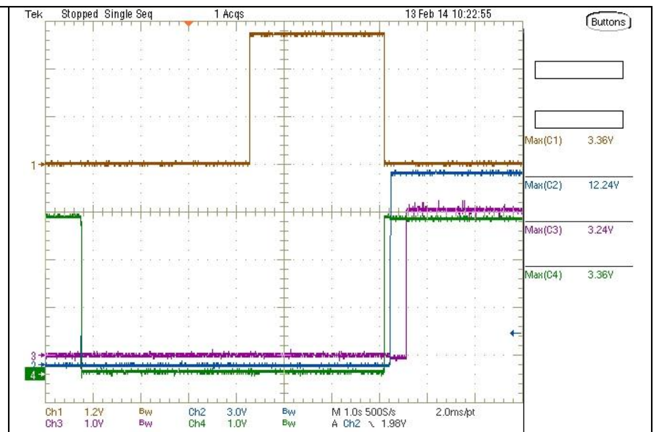
+12V Short; O/P short Then Turn on ;
I/P:200Vac,O/P:Min load by PSON#
CH1: PSON
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; O/P short Then Turn on ;
I/P:200Vac,O/P:Max load by PSON#
CH1: PSON
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; O/P short Then Turn on ;
I/P:264Vac,O/P:Min load by PSON#
CH1: PSON
CH2: +12V
CH3: PWOK
CH4: SMB Alert



+12V Short; O/P short Then Turn on ;
I/P:264Vac,O/P:Max load by PSON#
CH1: PSON
CH2: +12V
CH3: PWOK
CH4: SMB Alert

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	50/C8h
2	STATUS_VOUT	7Ah	10h
3	STATUS_IOUT	7Bh	A1h or A0h

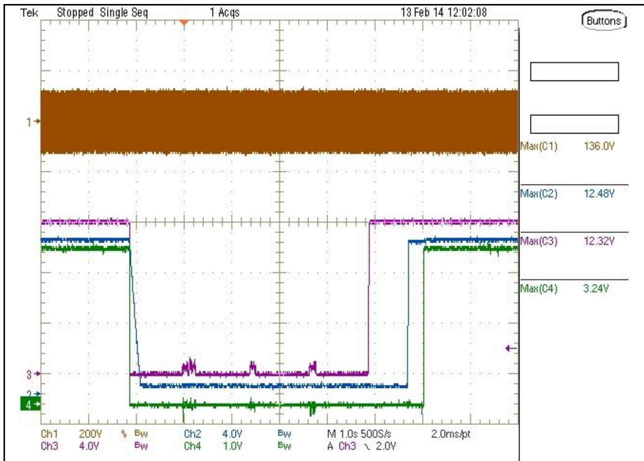
5.2 Short Circuit Protection

Test conditions:

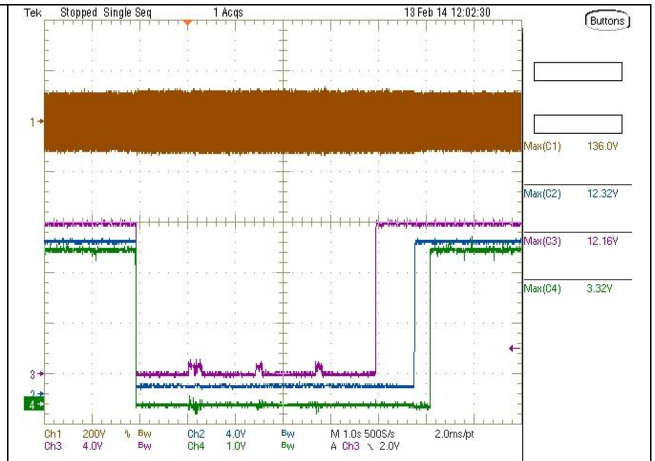
Sample NO.1

AMB. 25℃

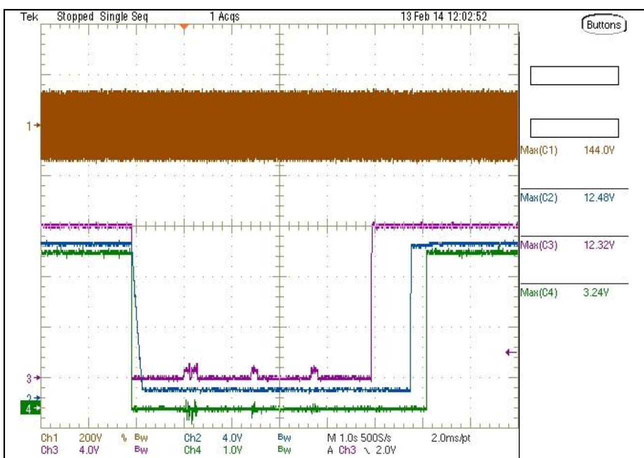
Graphical Result: PASS



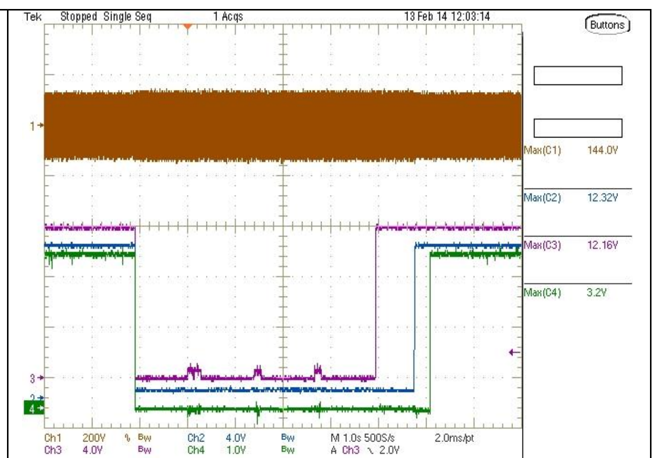
+12Vsb Short ,Turn on Then O/P short;
I/P:90Vac,O/P:Min load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK



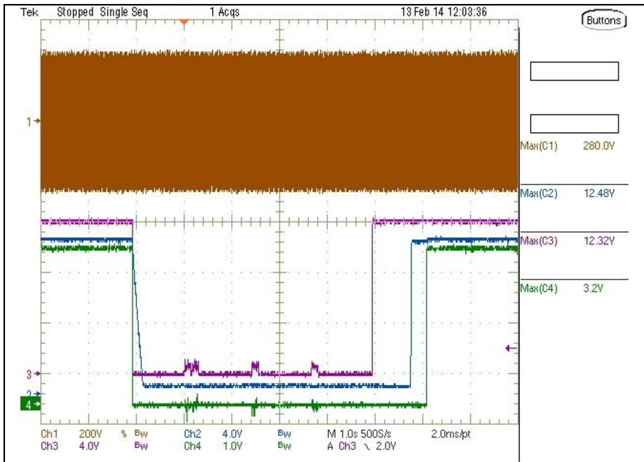
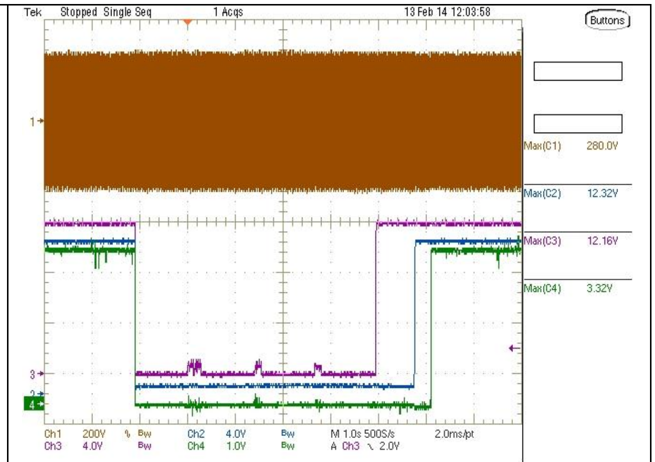
+12Vsb Short ,Turn on Then O/P short;
I/P:90Vac,O/P:Max load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb Short ,Turn on Then O/P short;
I/P:100Vac,O/P:Min load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb Short ,Turn on Then O/P short;
I/P:100Vac,O/P:Max load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK

<table>
<tr><td>
</td><td>
</td></tr>
<tr><td>+12Vsb Short ,Turn on Then O/P short;
I/P:200Vac,O/P:Min load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK</td><td>+12Vsb Short ,Turn on Then O/P short;
I/P:200Vac,O/P:Max load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK</td></tr>
</table>

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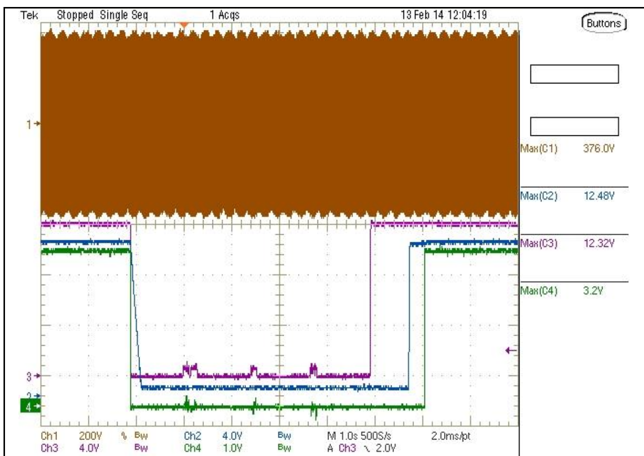
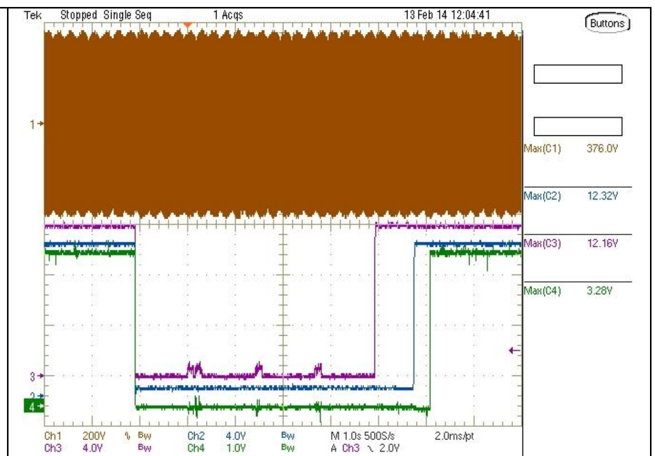
<tr><td>
</td><td>
</td></tr>
<tr><td>+12Vsb Short ,Turn on Then O/P short;
I/P:264Vac,O/P:Min load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK</td><td>+12Vsb Short ,Turn on Then O/P short;
I/P:264Vac,O/P:Max load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK</td></tr>
</table>

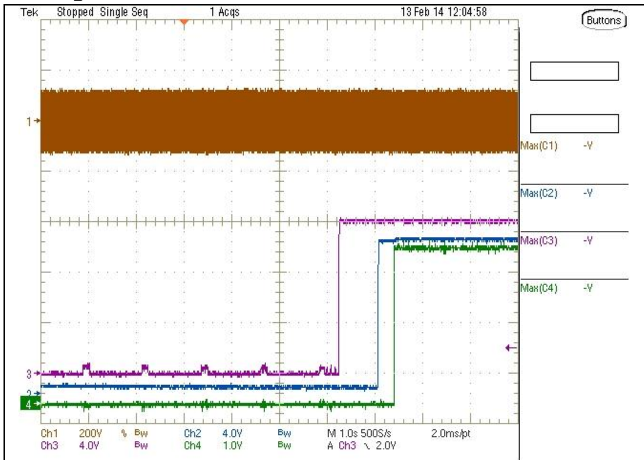
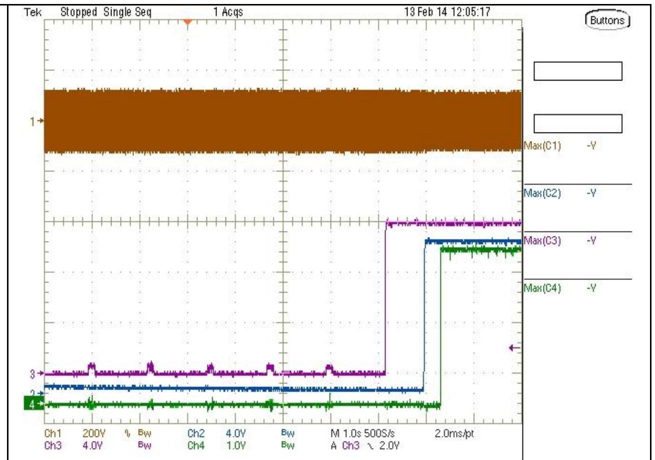
5.2 Short Circuit Protection

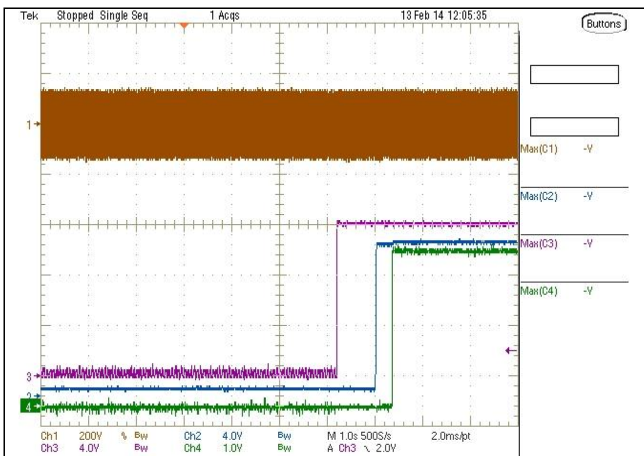
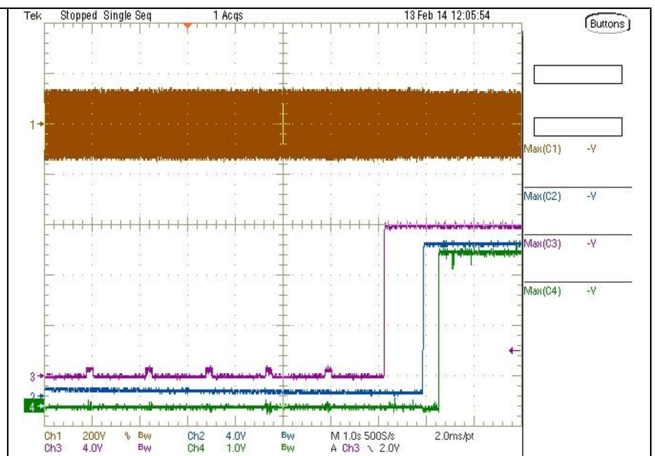
Test conditions:

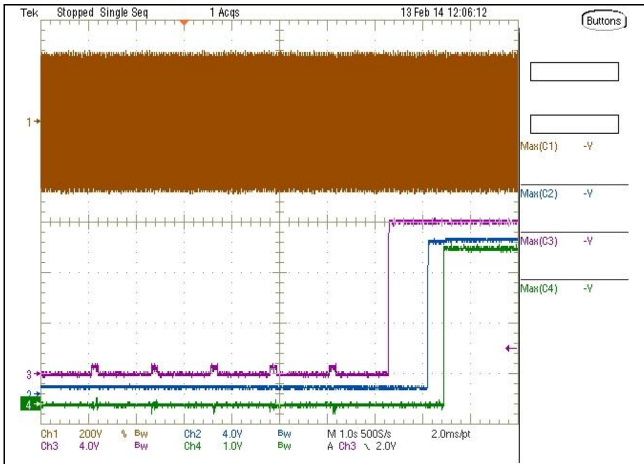
Sample NO.1

AMB. 25℃

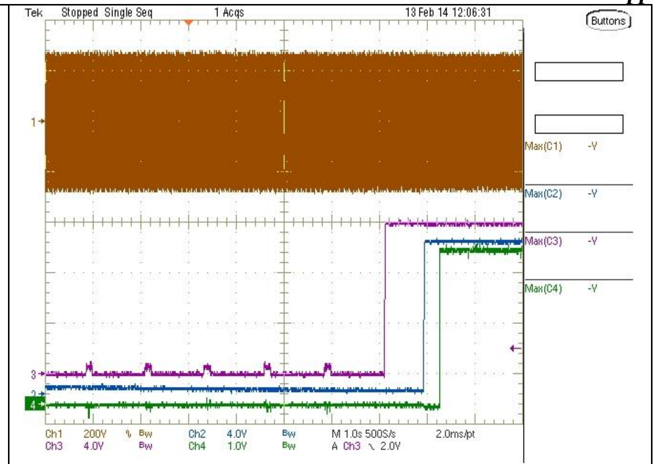
Graphical Result: PASS

	
+12Vsb Short , O/P shor Then Turn on; I/P:90Vac,O/P:Min load (1) AC I/P (2) 12V (3) 12Vsb (4) PWOK	+12Vsb Short , O/P shor Then Turn on; I/P:90Vac,O/P:Max load (1) AC I/P (2) 12V (3) 12Vsb (4) PWOK

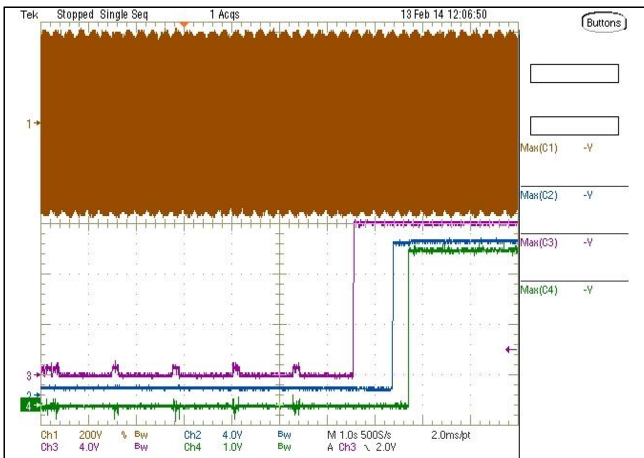
	
+12Vsb Short , O/P shor Then Turn on; I/P:100Vac,O/P:Min load (1) AC I/P (2) 12V (3) 12Vsb (4) PWOK	+12Vsb Short , O/P shor Then Turn on; I/P:100Vac,O/P:Max load (1) AC I/P (2) 12V (3) 12Vsb (4) PWOK



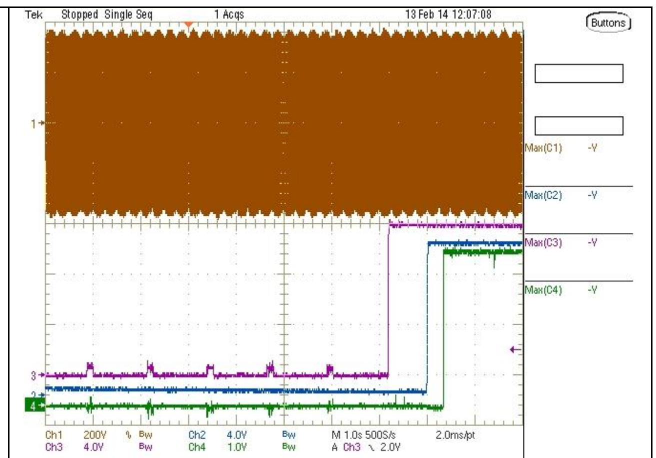
+12Vsb Short , O/P shor Then Turn on;
I/P:200Vac,O/P:Min load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb Short , O/P shor Then Turn on;
I/P:200Vac,O/P:Max load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb Short , O/P shor Then Turn on;
I/P:264Vac,O/P:Min load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb Short , O/P shor Then Turn on;
I/P:264Vac,O/P:Max load
(1) AC I/P
(2) 12V
(3) 12Vsb
(4) PWOK

5.3 Over Voltage Protection

Over voltage and under voltage are internal of a power supply due to a failure only the faulty power supply switches off. The power supply shuts down in a latch off mode after over voltage or under voltage condition. This latch can be cleared by a PSON assertion or PMBus ON/OFF command or by an AC power interruption. The table below contains the over and under voltage limits. The values are measured at the remote sense line input, the +12VSB at the power supply's DC connector. Any over voltage condition will cause the PWOK signal to go LOW, the bi-color LED will change from GREEN to AMBER. The control path and the protection path are separated by components and traces.

Table13: Over and Under Voltage Protection

Output	UV Protection Point	OV Protection Point
+12V	10V ~11V	13.0V ~14.5V
+12VSB	None	13.0V ~ 14.5V

*The over and under voltage shall perform at minimum output load condition.

5.3 Over Voltage and Under Voltage Protection

Test conditions:

Sample NO.1

AMB. 25℃

INPUT: 180Vac/60Hz

Output Load: +12V/0.5A, +12Vsb/0.05A

5.3.6.0 SMBALERT_MASK

Due to SMBALERT_MASK default are all masked. Before testing, change related mask value to verify SMBALERT behavior.

STEP1: Use **PAGE_PLUS_WRITE (Command 6) to set SMBALERT_MASK value(0x3F) of STATUS_VOUT in PAGE 01.(Enable VOUT_UV_FAULT SMBALERT)**

S	Slave Address	W	A	05h	A	04h	A	Page	A	1Bh	A	7Ah	EFh	PEC	P

STEP2: Use **PAGE_PLUS_READ (COMMAND 8) to read SMBALERT_MASK value of STATUS_VOUT in PAGE 01**

NO.	Test Item	Register Address	SMBALERT_MASK Data Byte
1	STATUS_VOUT	7Ah	EFh

STEP1: AC I/P = 180VAC/60Hz, Load: 12VSB@0.2A +12V@3A, Turn on(PSON) PSU.

STEP2: Set UVP condition(+12V_UVP short to 12V) until power supply shutdown.

STEP3: The LED should be amber. The SMBAlert is Low.

STEP4: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/88h
2	STATUS_VOUT	7Ah	10h

STEP5: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_VOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/88h
2	STATUS_VOUT	7Ah	10h

STEP6: Turn off (PSOFF) power supply. The SMBAlert is Low.

STEP7: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/88h
2	STATUS_VOUT	7Ah	10h

STEP8: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_VOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/88h
2	STATUS_VOUT	7Ah	10h

STEP9: Turn on(PSON) power supply. The SMBAlert is High.

STEP10: Use **PAGE_PLUS_WRITE (Command 6) to clear STATUS_VOUT of PAGE 00 and PAGE 01**

STEP11: Use **Command 5 and 3: Read Word and Read Byte,** read address 79h and 7Ah

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_VOUT	7Ah	00h

STEP1: AC I/P = 180VAC/60Hz, Load: 12VSB@0.2A +12V@3A, Turn on(PSON) PSU.

STEP2: Set UVP condition(+12V_UVP short to 12V) until power supply shutdown.

STEP3: The LED should be amber. The SMBAlert is Low.

STEP4: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/88h
2	STATUS_VOUT	7Ah	10h

STEP5: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_VOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/88h
2	STATUS_VOUT	7Ah	10h

STEP6: Turn off (PSOFF) power supply. The SMBAlert is Low.

STEP7: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/88h
2	STATUS_VOUT	7Ah	10h

STEP8: Use **PAGE_PLUS_READ (COMMAND 8) to read STATUS_VOUT and STATUS_WORD of PAGE 00 and PAGE 01**

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	41/88h
2	STATUS_VOUT	7Ah	10h

STEP9: Turn on(PSON) power supply. The SMBAlert is High.

STEP10: Use **PAGE_PLUS_WRITE (Command 6) to clear STATUS_VOUT of PAGE 00 and PAGE 01**

STEP11: Use **Command 5 and 3: Read Word and Read Byte,** read address 79h and 7Ah

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_VOUT	7Ah	00h

5.3 Over Voltage and Under Voltage Protection

Test conditions:

Sample NO.1

AMB. 25℃

INPUT: 180Vac/60Hz

Output Load: +12V/0.5A, +12Vsb/0.05A

STEP9: Turn on(PSON) power supply. The SMBAlert is High.

STEP10: Use **PAGE_PLUS_WRITE (Command 6) to clear STATUS_VOUT of PAGE 00 and PAGE 01**

STEP11: Use **Command 5 and 3: Read Word and Read Byte,** read address 79h and 7Ah

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_VOUT	7Ah	00h

Test Result: PASS

5.3 Over Voltage Protection

Test conditions:

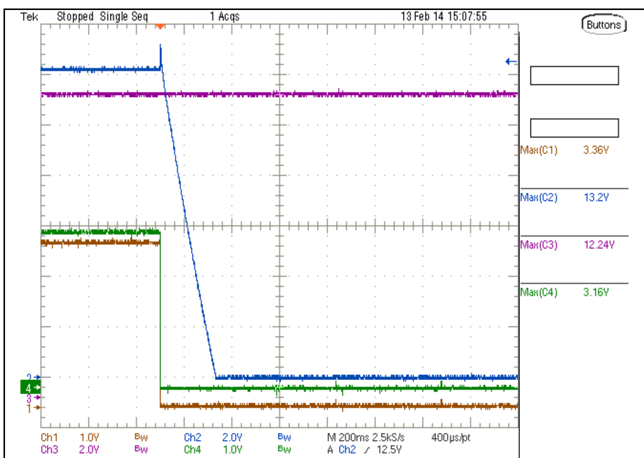
Sample NO.1

AMB. 25℃

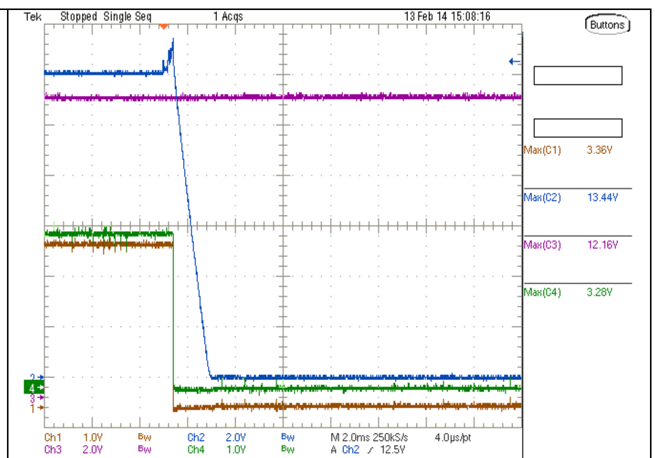
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

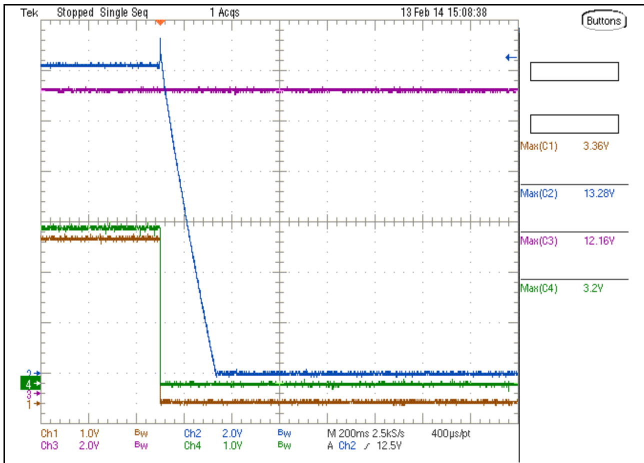
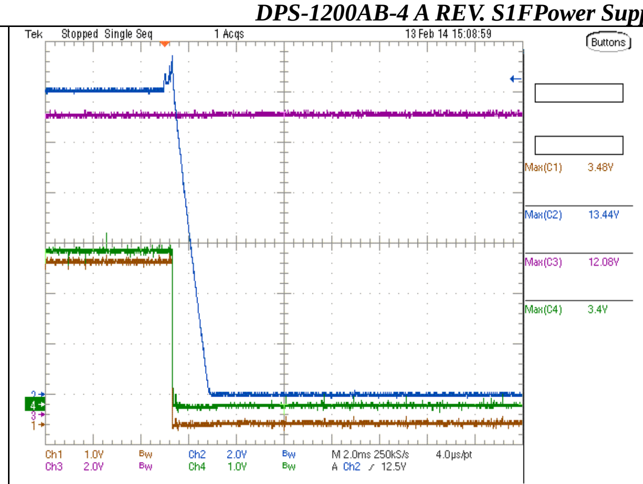
Test Condition	Max Spec (V)	Min Spec (V)	OVP reading (V)	Alert	+12Vsb	PW_OK	Result
+12V OVP Turn on then OVP; I/P:90Vac,O/P:Min load	14.50	13.00	13.200	3.360	12.240	3.160	PASS
+12V OVP Turn on then OVP; I/P:90Vac,O/P:Max load	14.50	13.00	13.440	3.360	12.160	3.280	PASS
+12V OVP Turn on then OVP; I/P:100Vac,O/P:Min load	14.50	13.00	13.280	3.360	12.160	3.200	PASS
+12V OVP Turn on then OVP; I/P:100Vac,O/P:Max load	14.50	13.00	13.440	3.480	12.080	3.400	PASS
+12V OVP Turn on then OVP; I/P:200Vac,O/P:Min load	14.50	13.00	13.280	3.360	12.160	3.200	PASS
+12V OVP Turn on then OVP; I/P:200Vac,O/P:Max load	14.50	13.00	13.280	3.360	12.080	3.360	PASS
+12V OVP Turn on then OVP; I/P:264Vac,O/P:Min load	14.50	13.00	13.360	3.360	12.160	3.200	PASS
+12V OVP Turn on then OVP; I/P:264Vac,O/P:Max load	14.50	13.00	13.440	3.360	12.160	3.200	PASS

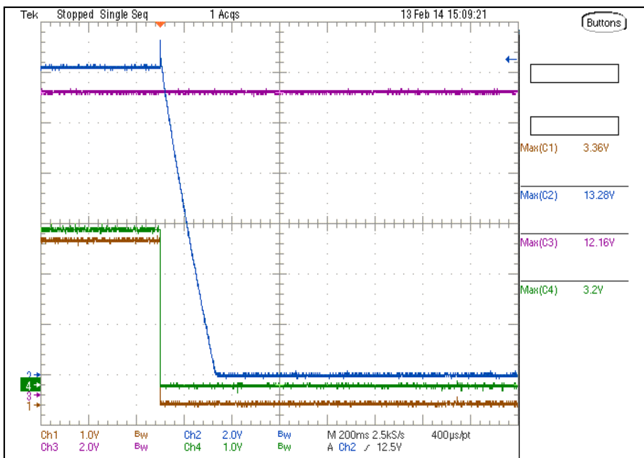
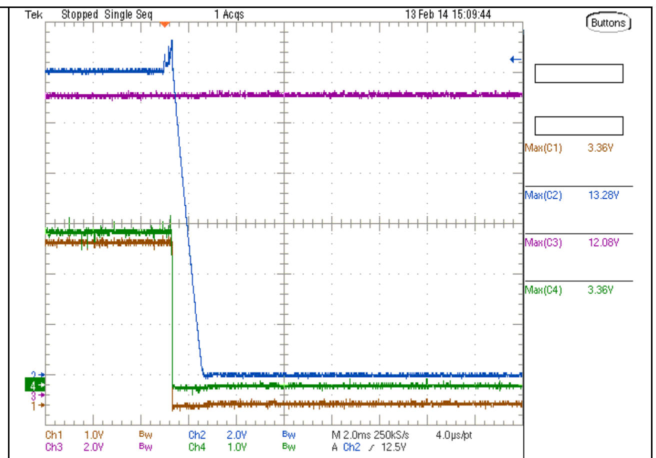


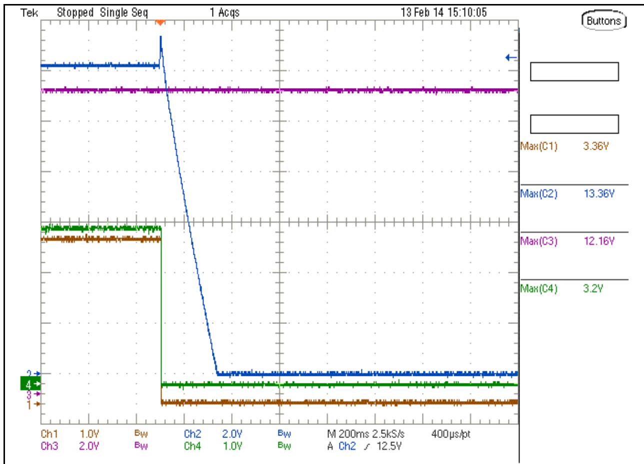
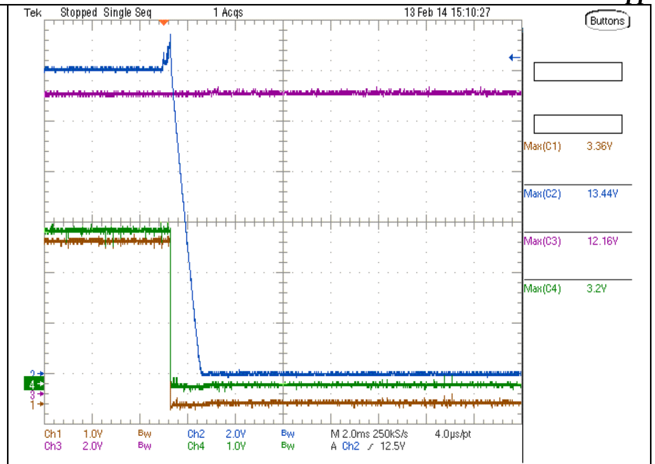
+12V OVP Turn on then OVP;
I/P:90Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12V OVP Turn on then OVP;
I/P:90Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK

	
+12V OVP Turn on then OVP; I/P:100Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	+12V OVP Turn on then OVP; I/P:100Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK

	
+12V OVP Turn on then OVP; I/P:200Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	+12V OVP Turn on then OVP; I/P:200Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK

	
+12V OVP Turn on then OVP; I/P:264Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	+12V OVP Turn on then OVP; I/P:264Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	60/88h or 60/A8h
2	STATUS_VOUT	7Ah	80h
3	STATUS_IOUT	7Bh	00h

5.3 Over Voltage Protection

Test conditions:

Sample NO.1

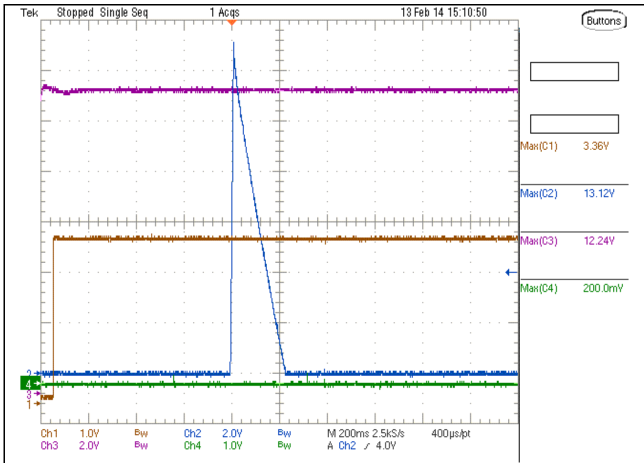
AMB. 25℃

Test 1	90V/47Hz	+12V/82A, +12Vsb/2A
Test 2	100V/60Hz	+12V/82A, +12Vsb/2A
Test 3	180V/47Hz	+12V/98A, +12Vsb/2A
Test 4	264V/63Hz	+12V/0.5A, +12Vsb/0.05A

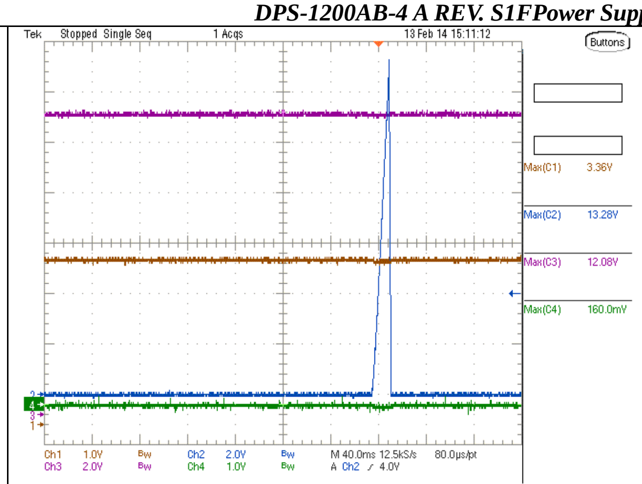
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

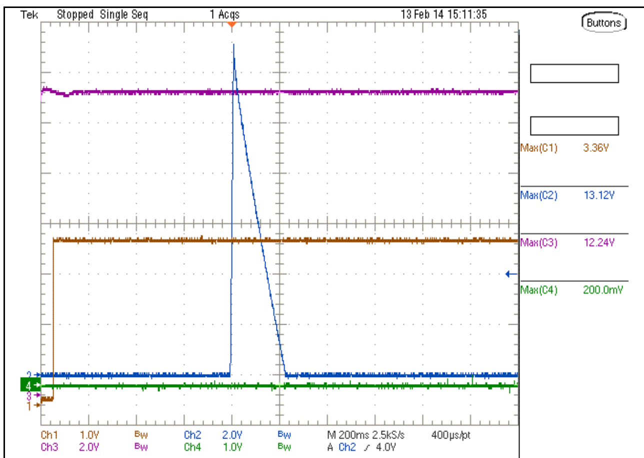
Test Condition	Max Spec (V)	Min Spec (V)	OVP reading (V)	Alert	+12Vsb	PW_OK	Result
+12V OVP OVP then Turn on; I/P:90Vac,O/P:Min load	14.50	13.00	13.120	3.360	12.240	0.200	PASS
+12V OVP OVP then Turn on; I/P:90Vac,O/P:Max load	14.50	13.00	13.280	3.360	12.080	0.160	PASS
+12V OVP OVP then Turn on; I/P:100Vac,O/P:Min load	14.50	13.00	13.120	3.360	12.240	0.200	PASS
+12V OVP OVP then Turn on; I/P:100Vac,O/P:Max load	14.50	13.00	13.040	3.320	12.160	0.200	PASS
+12V OVP OVP then Turn on; I/P:200Vac,O/P:Min load	14.50	13.00	13.040	3.320	12.240	0.120	PASS
+12V OVP OVP then Turn on; I/P:200Vac,O/P:Max load	14.50	13.00	13.040	3.320	12.080	0.160	PASS
+12V OVP OVP then Turn on; I/P:264Vac,O/P:Min load	14.50	13.00	13.200	3.320	12.240	0.160	PASS
+12V OVP OVP then Turn on; I/P:264Vac,O/P:Max load	14.50	13.00	13.040	3.360	12.160	0.120	PASS



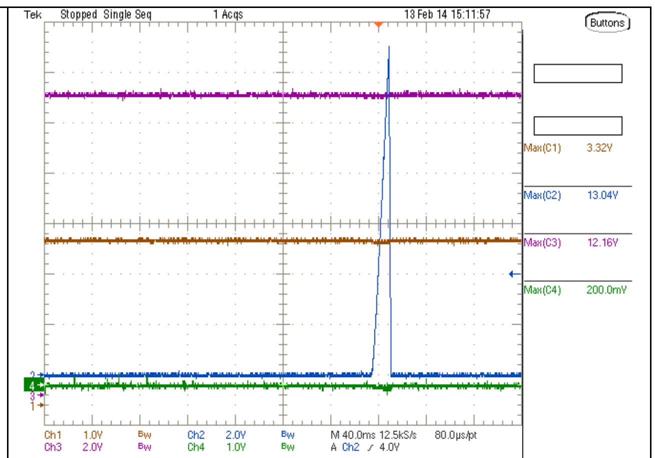
+12V OVP OVP then Turn on;
I/P:90Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



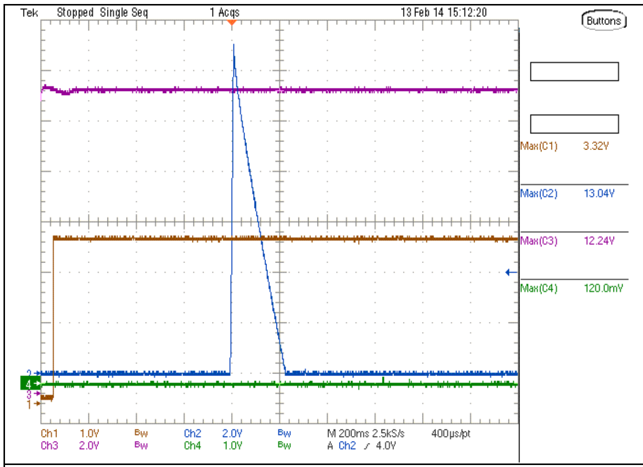
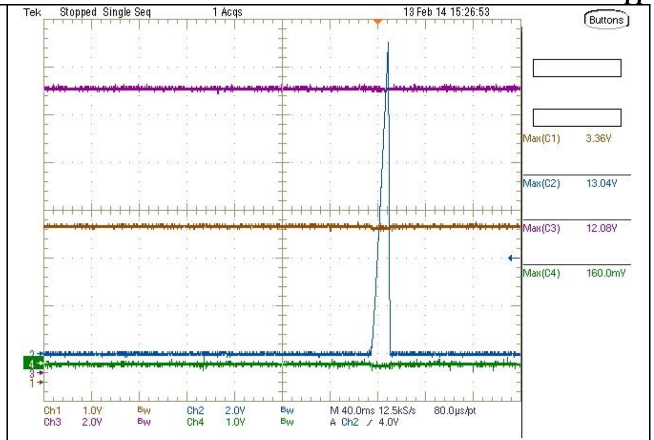
+12V OVP OVP then Turn on;
I/P:90Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK

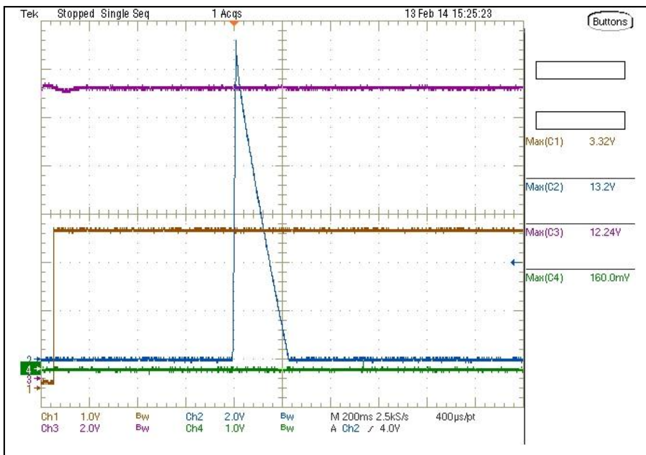
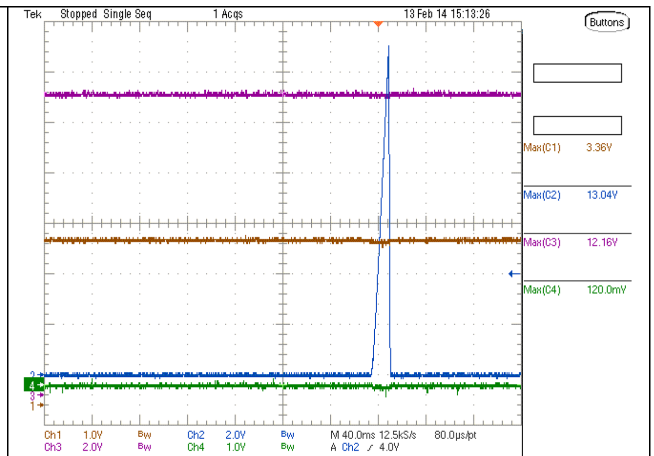


+12V OVP OVP then Turn on;
I/P:100Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12V OVP OVP then Turn on;
I/P:100Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK

	
+12V OVP OVP then Turn on; I/P:200Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	+12V OVP OVP then Turn on; I/P:200Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK

	
+12V OVP OVP then Turn on; I/P:264Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	+12V OVP OVP then Turn on; I/P:264Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	60/C8h or 60/88h
2	STATUS_VOUT	7Ah	80h
3	STATUS_IOUT	7Bh	21h or 00h

5.3 Over Voltage Protection

Test conditions:

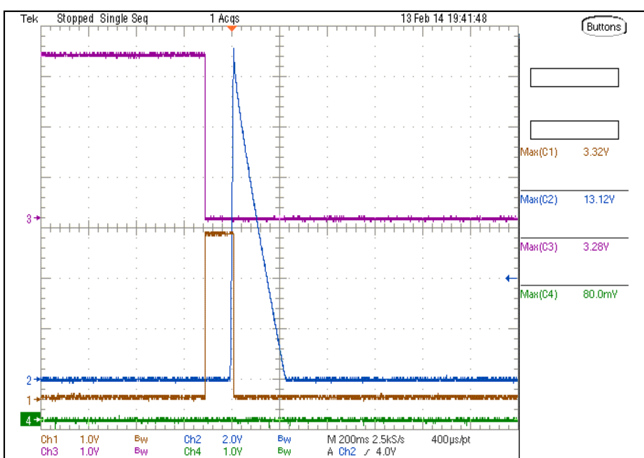
Sample NO.1

AMB. 25℃

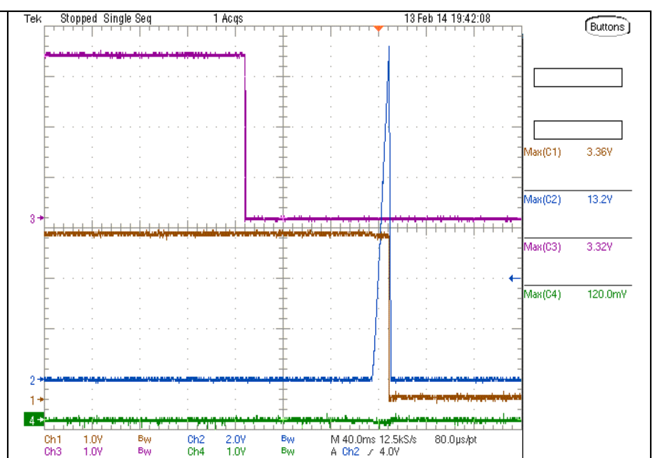
Capacitive Load: +12V/25000uF, +12Vsb/5000uF

Graphical Result: PASS

Test Condition	Max Spec (V)	Min Spec (V)	OVP reading (V)	Alert	+12Vsb	PW_OK	Result
+12V OVP OVP then Turn on; I/P:90Vac,O/P:Min load by PSON#	14.50	13.00	13.120	3.320	3.280	0.080	PASS
+12V OVP OVP then Turn on; I/P:90Vac,O/P:Max load by PSON#	14.50	13.00	13.200	3.360	3.320	0.120	PASS
+12V OVP OVP then Turn on; I/P:100Vac,O/P:Min load by PSON#	14.50	13.00	13.200	3.360	3.280	0.120	PASS
+12V OVP OVP then Turn on; I/P:100Vac,O/P:Max load by PSON#	14.50	13.00	13.040	3.360	3.320	0.120	PASS
+12V OVP OVP then Turn on; I/P:200Vac,O/P:Min load by PSON#	14.50	13.00	13.040	3.360	3.320	0.120	PASS
+12V OVP OVP then Turn on; I/P:200Vac,O/P:Max load by PSON#	14.50	13.00	13.200	3.360	3.280	0.200	PASS
+12V OVP OVP then Turn on; I/P:264Vac,O/P:Min load by PSON#	14.50	13.00	13.120	3.360	3.320	0.160	PASS
+12V OVP OVP then Turn on; I/P:264Vac,O/P:Max load by PSON#	14.50	13.00	13.040	3.360	3.280	0.120	PASS

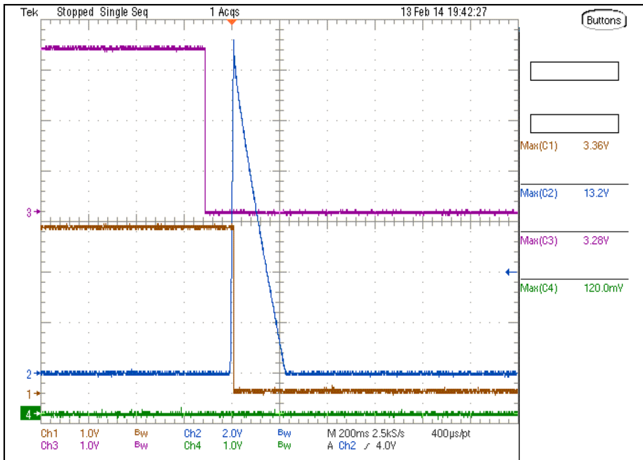
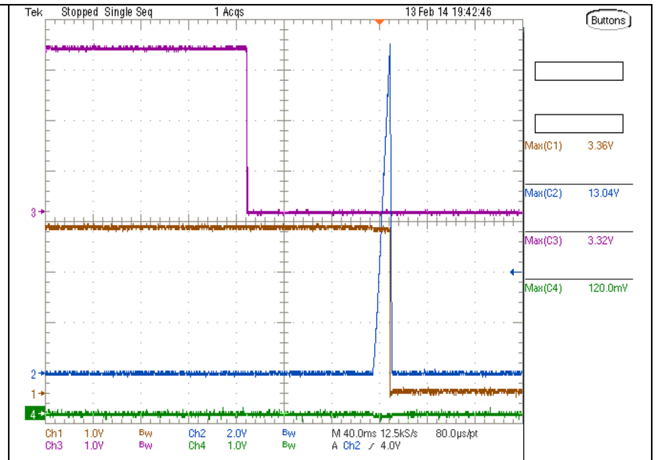


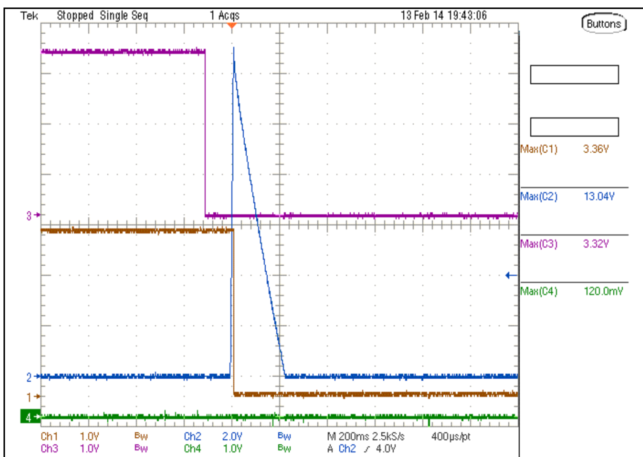
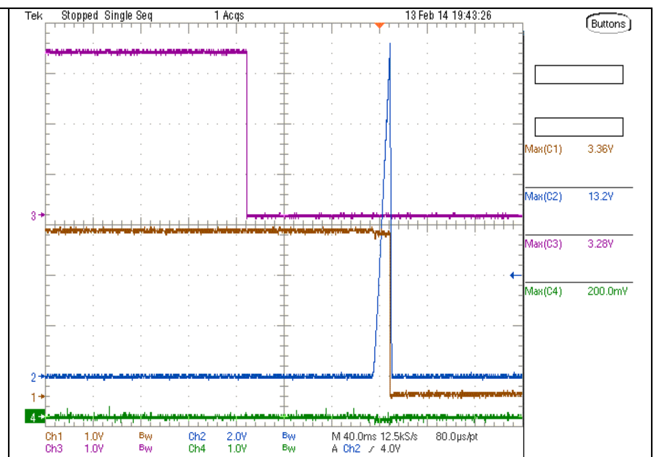
+12V OVP OVP then Turn on; I/P:90Vac,O/P:Min load by PSON#

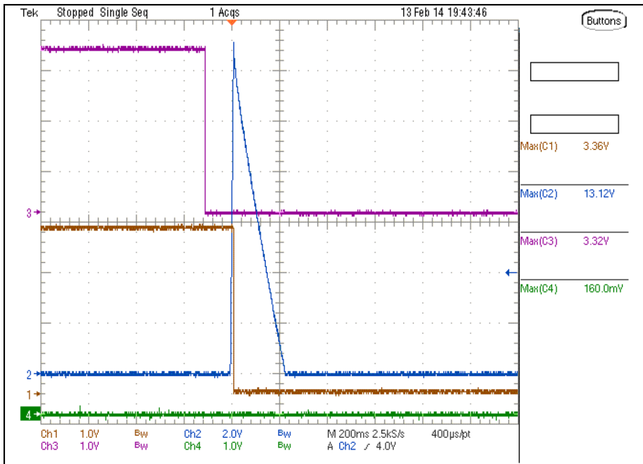


+12V OVP OVP then Turn on; I/P:90Vac,O/P:Max load by PSON#

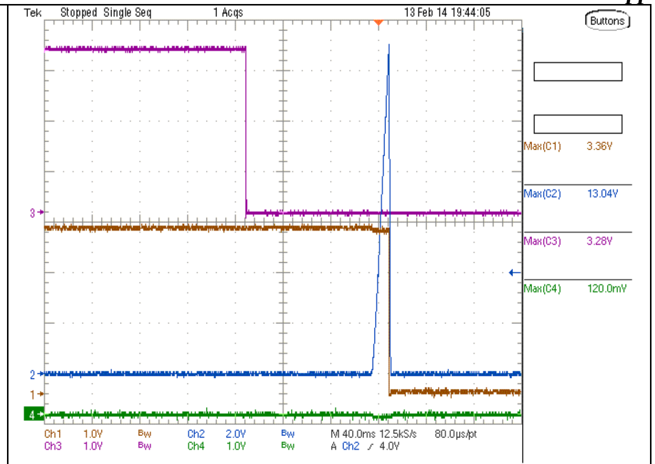
(1) SMB Alert (2) 12V (3) PSON# (4) PWOK	(1) SMB Alert (2) 12V (3) PSON# (4) PWOK

	
+12V OVP OVP then Turn on; I/P:100Vac,O/P:Min load by PSON# (1) SMB Alert (2) 12V (3) PSON# (4) PWOK	+12V OVP OVP then Turn on; I/P:100Vac,O/P:Max load by PSON# (1) SMB Alert (2) 12V (3) PSON# (4) PWOK

	
+12V OVP OVP then Turn on; I/P:200Vac,O/P:Min load by PSON# (1) SMB Alert (2) 12V (3) PSON# (4) PWOK	+12V OVP OVP then Turn on; I/P:200Vac,O/P:Max load by PSON# (1) SMB Alert (2) 12V (3) PSON# (4) PWOK



+12V OVP OVP then Turn on;
I/P:264Vac,O/P:Min load by PSON#
(1) SMB Alert
(2) 12V
(3) PSON#
(4) PWOK



+12V OVP OVP then Turn on;
I/P:264Vac,O/P:Max load by PSON#
(1) SMB Alert
(2) 12V
(3) PSON#
(4) PWOK

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	60/88h
2	STATUS_VOUT	7Ah	80h
3	STATUS_IOUT	7Bh	00h

5.3 Over Voltage and Under Voltage Protection

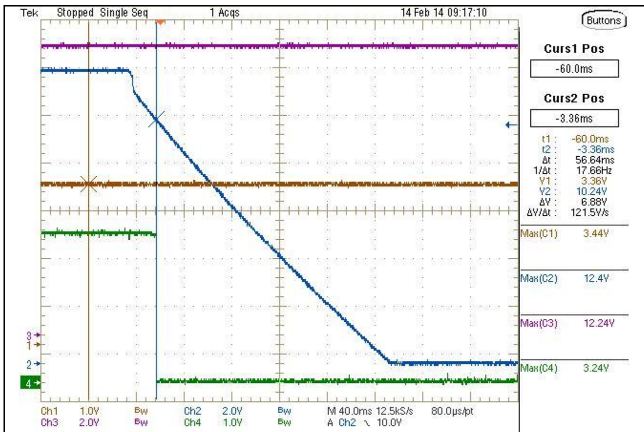
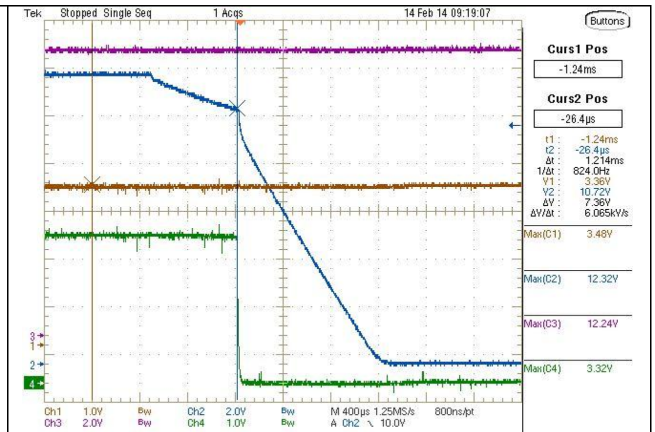
Test conditions:

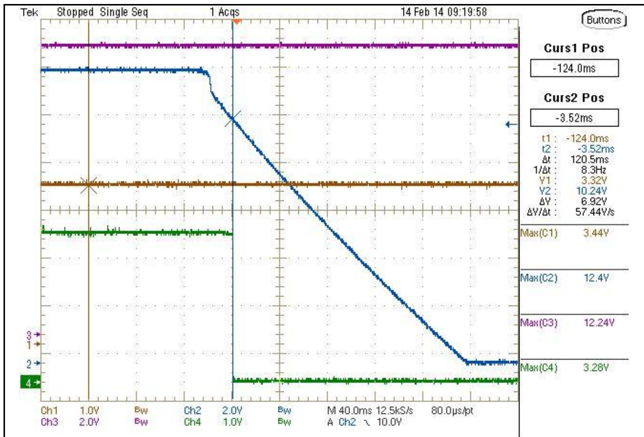
Sample NO.1

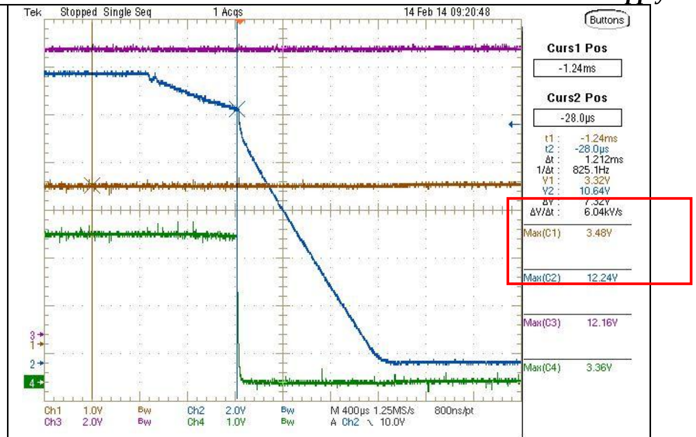
AMB. 25℃

Graphical Result: PASS

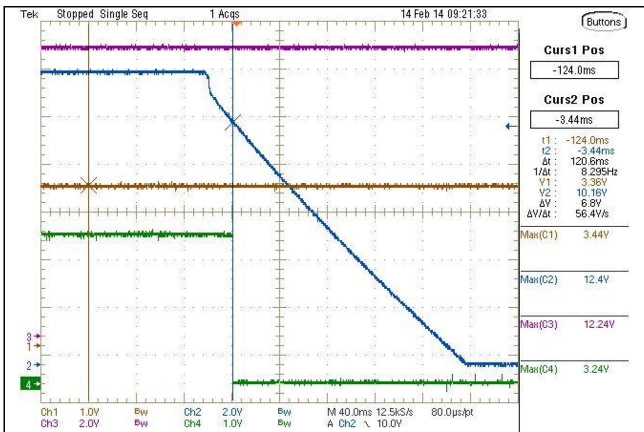
Test Condition	Max Spec (V)	Min Spec (V)	UVP reading (V)	Result
+12V UVP Turn on then UVP; I/P:90Vac,O/P:Min load	11.00	10.00	10.24	PASS
+12V UVP Turn on then UVP; I/P:90Vac,O/P:Max load	11.00	10.00	10.72	PASS
+12V UVP Turn on then UVP; I/P:100Vac,O/P:Min load	11.00	10.00	10.24	PASS
+12V UVP Turn on then UVP; I/P:100Vac,O/P:Max load	11.00	10.00	10.64	PASS
+12V UVP Turn on then UVP; I/P:200Vac,O/P:Min load	11.00	10.00	10.16	PASS
+12V UVP Turn on then UVP; I/P:200Vac,O/P:Max load	11.00	10.00	10.64	PASS
+12V UVP Turn on then UVP; I/P:264Vac,O/P:Min load	11.00	10.00	10.16	PASS
+12V UVP Turn on then UVP; I/P:264Vac,O/P:Max load	11.00	10.00	10.72	PASS

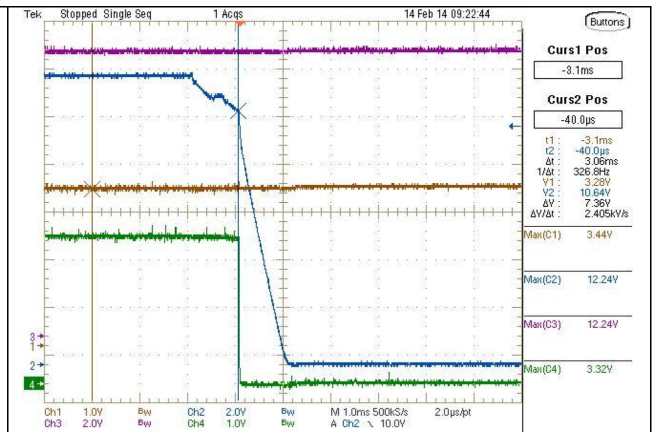
	
+12V UVP Turn on then UVP; I/P:90Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	+12V UVP Turn on then UVP; I/P:90Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK



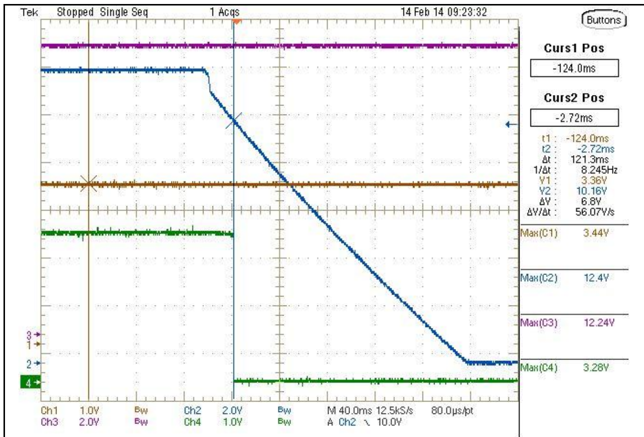


+12V UVP Turn on then UVP; I/P:100Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	+12V UVP Turn on then UVP; I/P:100Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK

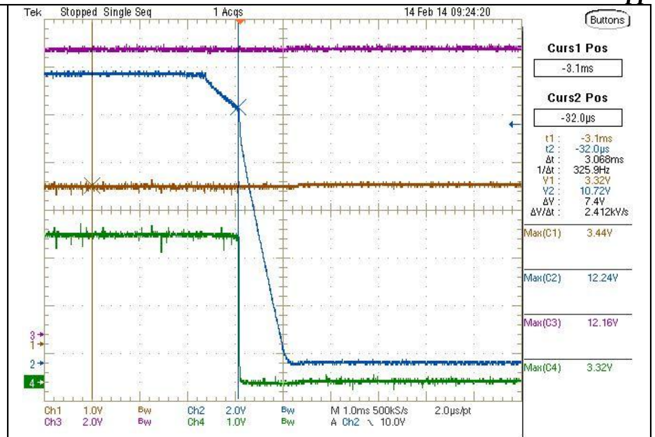




+12V UVP Turn on then UVP; I/P:200Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	+12V UVP Turn on then UVP; I/P:200Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK



+12V UVP Turn on then UVP;
I/P:264Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12V UVP Turn on then UVP;
I/P:264Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK

Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Ah and 7Bh

NO.	Test Item	Register Address	Read Data Byte
1	STATUS_WORD	79h	40/88h or 40/A8h
2	STATUS_VOUT	7Ah	10h
3	STATUS_IOUT	7Bh	00h

5.3 Over Voltage Protection

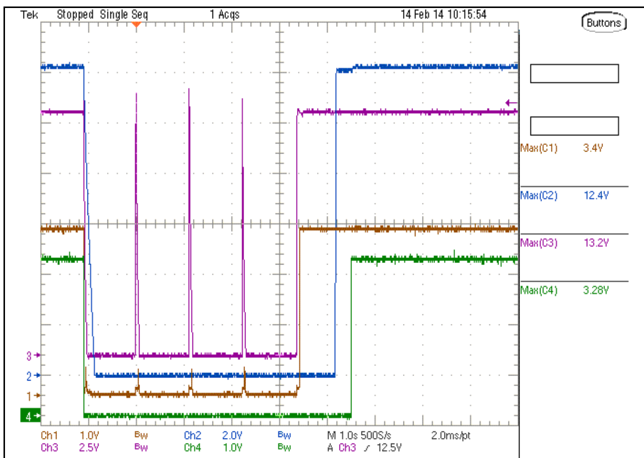
Test conditions:

Sample NO.1

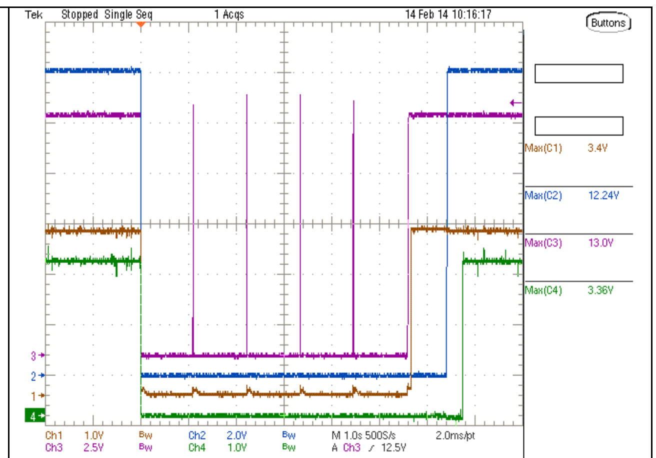
AMB. 25℃

Graphical Result: PASS

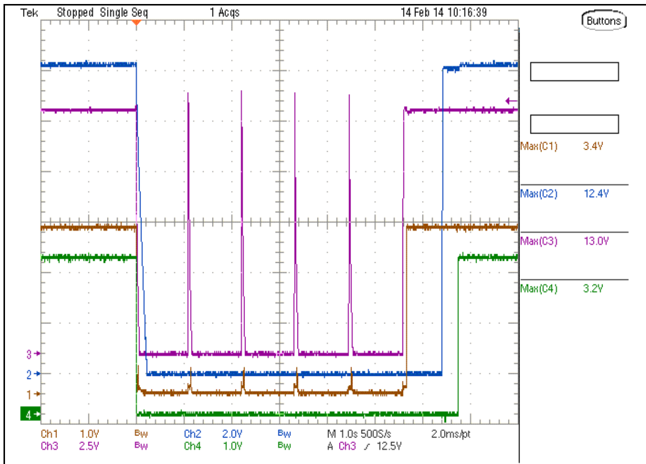
Test Condition	Max Spec (V)	Min Spec (V)	OVP reading (V)	Result
+12Vsb OVP Turn on then OVP; I/P:90Vac,O/P:Min load	14.50	13.00	13.100	PASS
+12Vsb OVP Turn on then OVP; I/P:90Vac,O/P:Max load	14.50	13.00	13.000	PASS
+12Vsb OVP Turn on then OVP; I/P:100Vac,O/P:Min load	14.50	13.00	13.000	PASS
+12Vsb OVP Turn on then OVP; I/P:100Vac,O/P:Max load	14.50	13.00	13.000	PASS
+12Vsb OVP Turn on then OVP; I/P:200Vac,O/P:Min load	14.50	13.00	13.200	PASS
+12Vsb OVP Turn on then OVP; I/P:200Vac,O/P:Max load	14.50	13.00	13.000	PASS
+12Vsb OVP Turn on then OVP; I/P:264Vac,O/P:Min load	14.50	13.00	13.100	PASS
+12Vsb OVP Turn on then OVP; I/P:264Vac,O/P:Max load	14.50	13.00	13.000	PASS



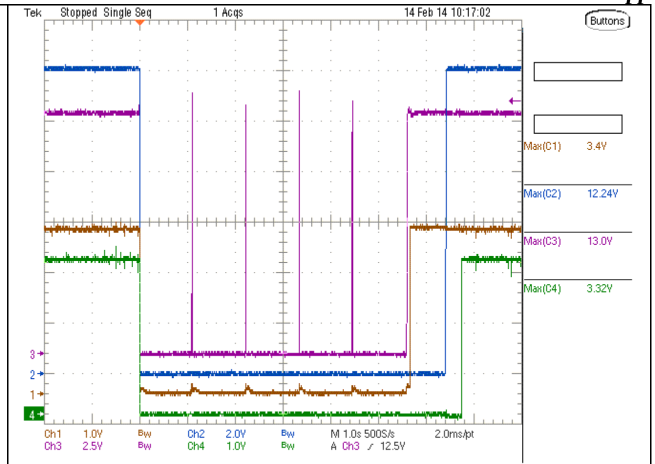
+12Vsb OVP Turn on then OVP;
I/P:90Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



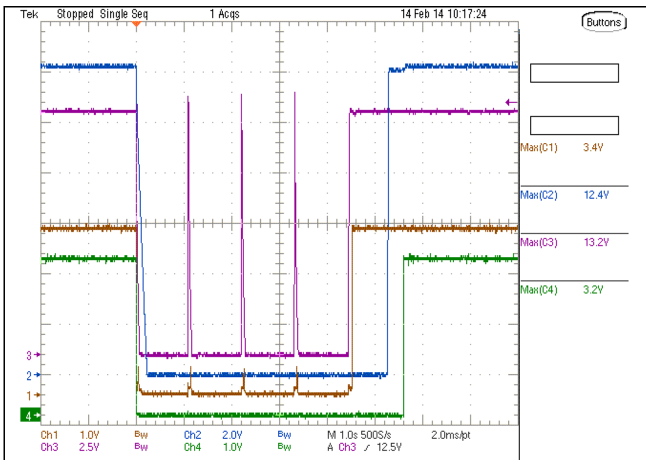
+12Vsb OVP Turn on then OVP;
I/P:90Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



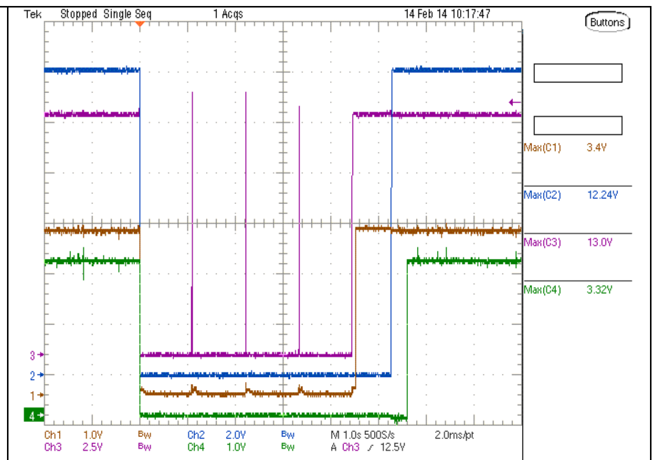
+12Vsb OVP Turn on then OVP;
I/P:100Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb OVP Turn on then OVP;
I/P:100Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb OVP Turn on then OVP;
I/P:200Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb OVP Turn on then OVP;
I/P:200Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK

<table>
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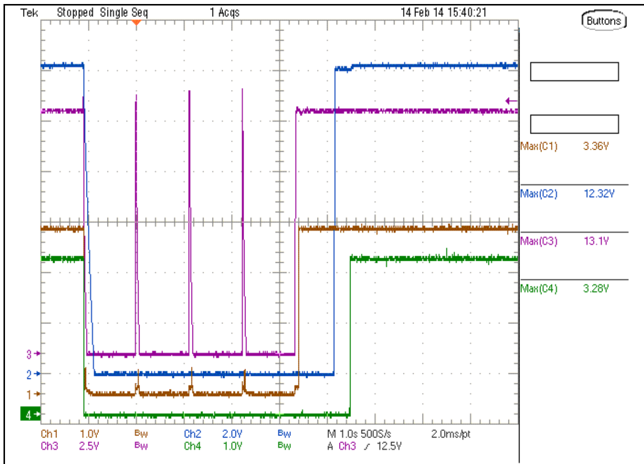
<td>
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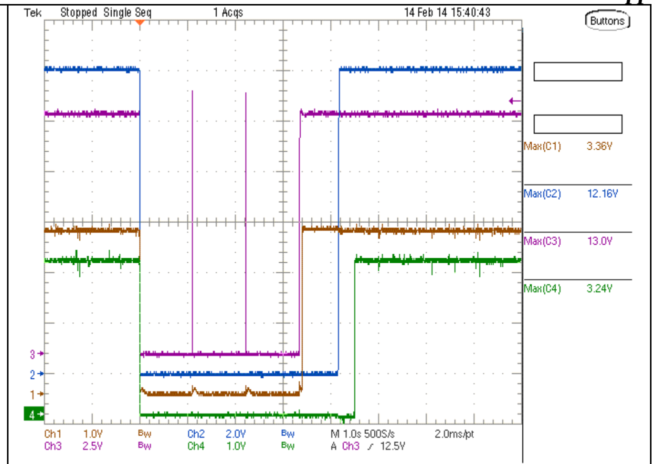
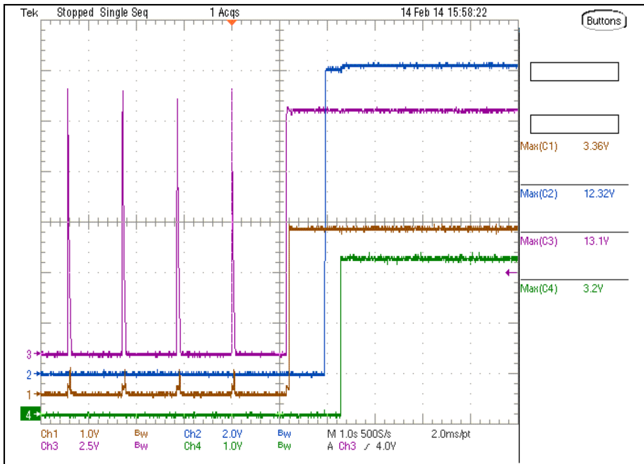
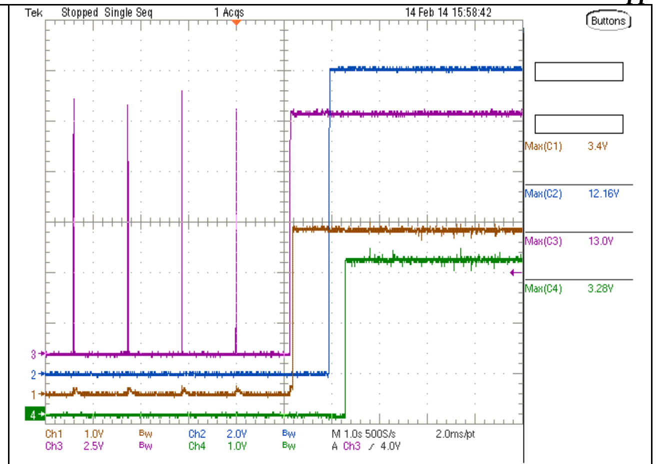
<td>
</td>
</tr>
<tr>
<td>+12Vsb OVP Turn on then OVP;
I/P:264Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK</td>
<td>+12Vsb OVP Turn on then OVP;
I/P:264Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK</td>
</tr>
</table>

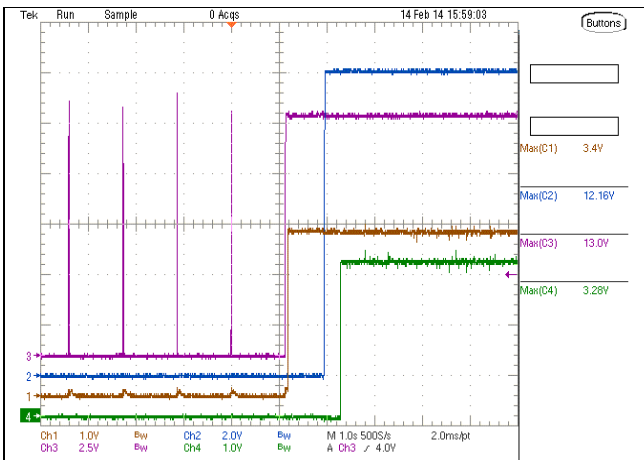
Test Condition	Max Spec (V)	Min Spec (V)	OVP reading (V)	Result
+12Vsb OVP OVP then Turn on ; I/P:90Vac,O/P:Min load	14.50	13.00	13.200	PASS
+12Vsb OVP OVP then Turn on ; I/P:90Vac,O/P:Max load	14.50	13.00	13.000	PASS
+12Vsb OVP OVP then Turn on ; I/P:100Vac,O/P:Min load	14.50	13.00	13.000	PASS
+12Vsb OVP OVP then Turn on ; I/P:100Vac,O/P:Max load	14.50	13.00	13.100	PASS
+12Vsb OVP OVP then Turn on ; I/P:200Vac,O/P:Min load	14.50	13.00	13.000	PASS
+12Vsb OVP OVP then Turn on ; I/P:200Vac,O/P:Max load	14.50	13.00	13.000	PASS
+12Vsb OVP OVP then Turn on ; I/P:264Vac,O/P:Min load	14.50	13.00	13.000	PASS
+12Vsb OVP OVP then Turn on ; I/P:264Vac,O/P:Max load	14.50	13.00	13.100	PASS



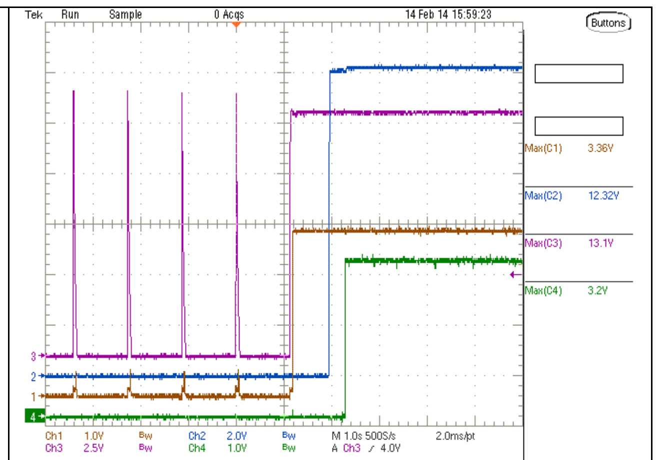
+12Vsb OVP OVP then Turn on ;
I/P:90Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



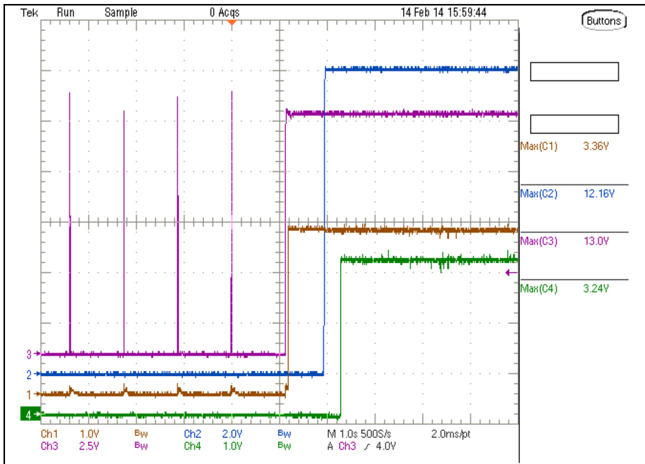
+12Vsb OVP OVP then Turn on ;
I/P:90Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



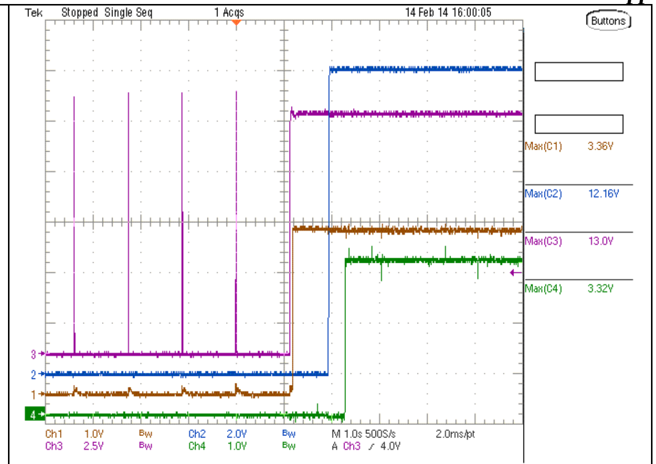
+12Vsb OVP OVP then Turn on ;
I/P:100Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



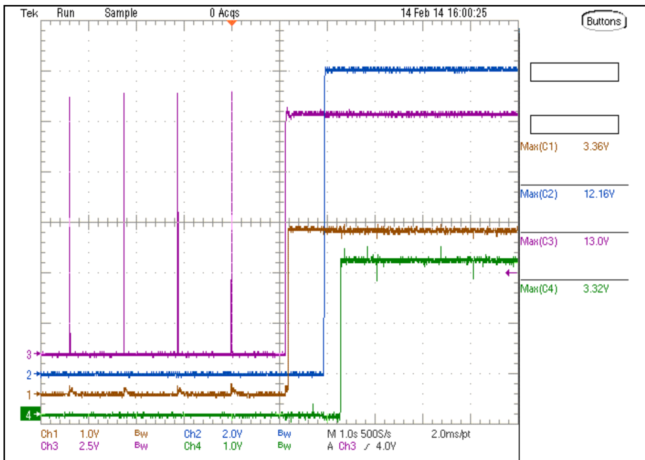
+12Vsb OVP OVP then Turn on ;
I/P:100Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



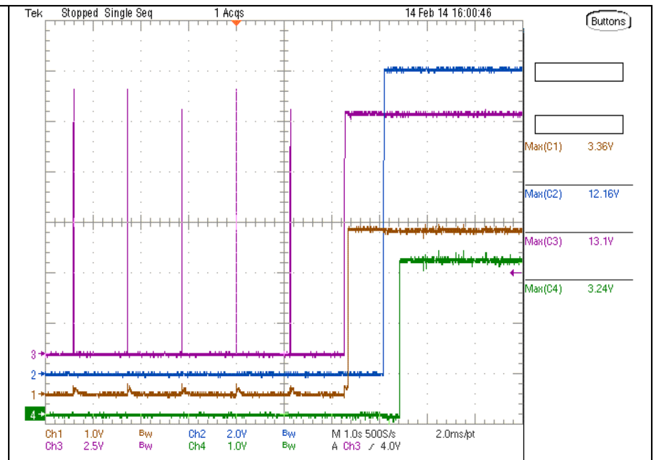
+12Vsb OVP OVP then Turn on ;
I/P:200Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb OVP OVP then Turn on ;
I/P:200Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb OVP OVP then Turn on ;
I/P:264Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



+12Vsb OVP OVP then Turn on ;
I/P:264Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK

5.4 Over Temperature Protection

There are three temp sensors in the power supply, first is in the heat sink of full bridge MosFET(over temperature point of PMBus reading:110degC, recover point of PMBus reading:95degC), second is in the heat sink of PFC MosFET(over temperature point of PMBus reading:110degC, recover point of PMBus reading: 95degC) and the other one is in the inlet location(over temperature point of PMBus reading:58degC, recover point of PMBus reading: 50degC when load is less than 86.92A, over temperature point of PMBus reading:58degC, recover point of PMBus reading: 50degC when load is greater than 86.92A).The power supply is protected against over temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an OTP condition the PSU shuts down. The standby outputs may also shut down or remain powered on. When the power supply temperature drops to (within) specified limits, the power supply restores power automatically. The OTP circuit has a built in at least 4 degree ℃ hysteretic such that the power supply does not oscillate on and off due to temperature recovering condition. At an OTP condition the PSOK signal goes LOW and the bi-color LED changes from GREEN to AMBER.

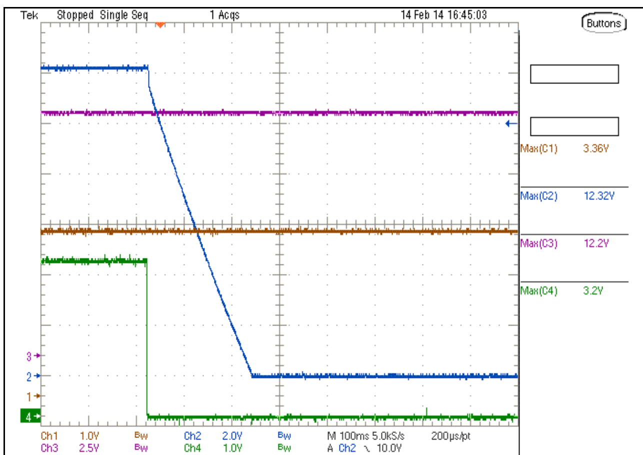
Test conditions:

Sample NO. 1

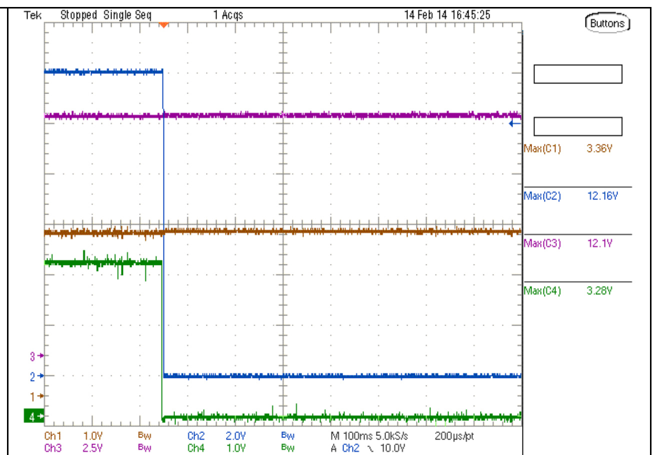
AMB. 25℃

Graphical Result: PASS

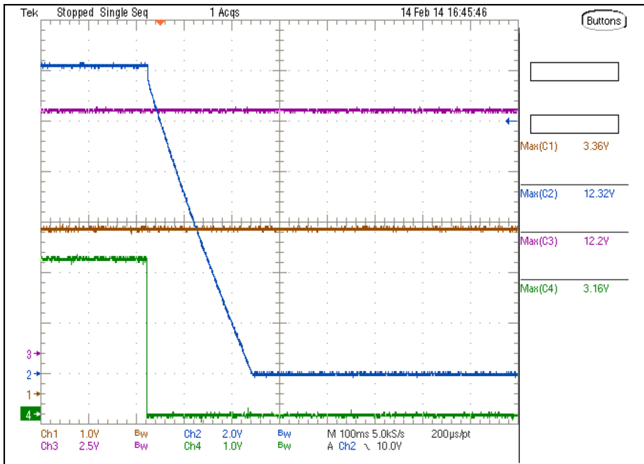
Test Condition	OVP reading (V)	Alert	+12Vsb	PW_OK	Result
OTP Turn on then OTP I/P:90Vac,O/P:Min load	12.320	3.360	12.200	3.200	PASS
OTP Turn on then OTP I/P:90Vac,O/P:Max load	12.160	3.360	12.100	3.280	PASS
OTP Turn on then OTP I/P:100Vac,O/P:Min load	12.320	3.360	12.200	3.160	PASS
OTP Turn on then OTP I/P:100Vac,O/P:Max load	12.160	3.360	12.100	3.320	PASS
OTP Turn on then OTP I/P:200Vac,O/P:Min load	12.320	3.360	12.200	3.160	PASS
OTP Turn on then OTP I/P:200Vac,O/P:Max load	12.160	3.320	12.100	3.240	PASS
OTP Turn on then OTP I/P:264Vac,O/P:Min load	12.320	3.360	12.200	3.160	PASS
OTP Turn on then OTP I/P:264Vac,O/P:Max load	12.160	3.400	12.100	3.320	PASS



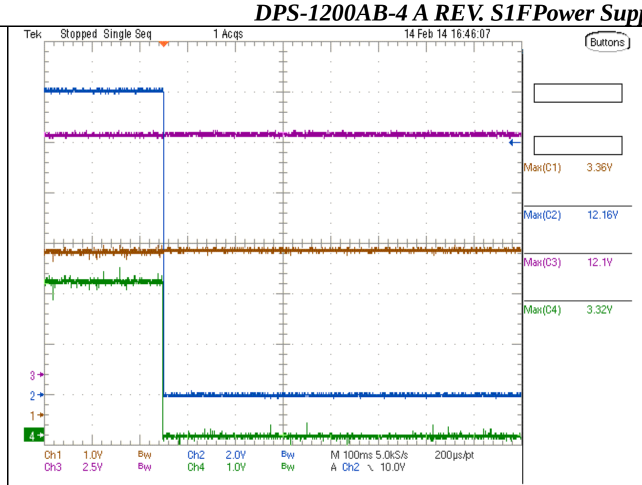
OTP Turn on then OTP I/P:90Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



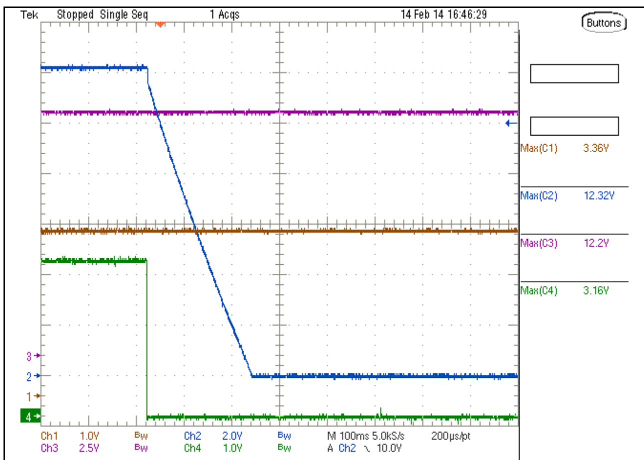
OTP Turn on then OTP I/P:90Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



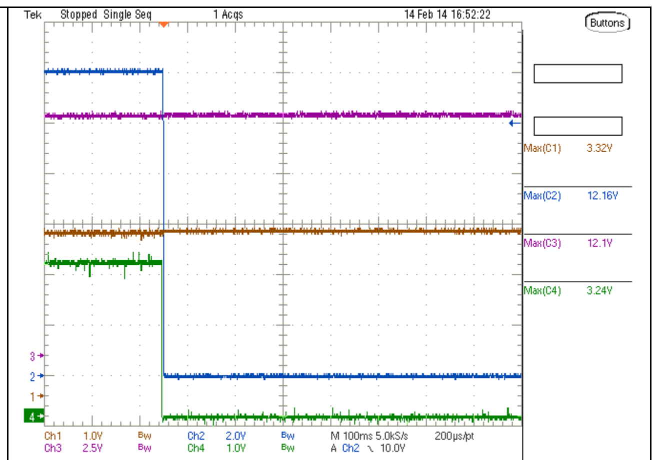
OTP Turn on then OTP I/P:100Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



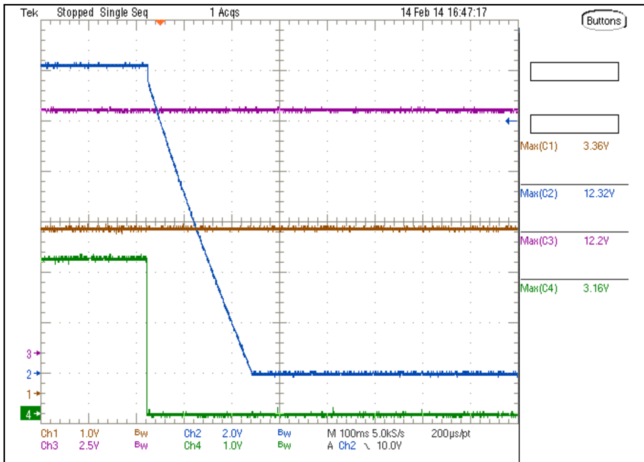
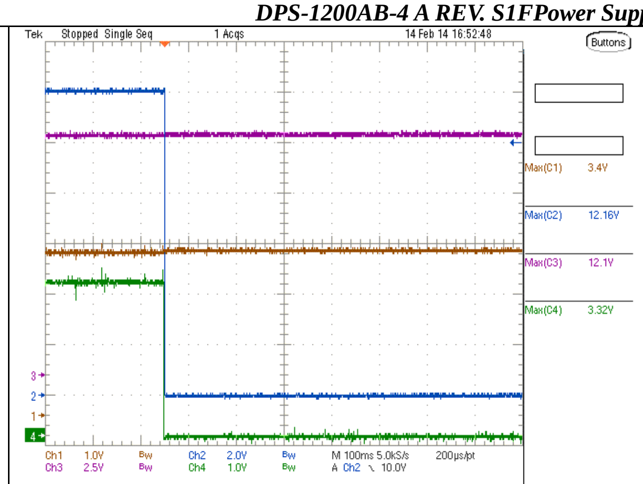
OTP Turn on then OTP I/P:100Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



OTP Turn on then OTP I/P:200Vac,O/P:Min load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK



OTP Turn on then OTP I/P:200Vac,O/P:Max load
(1) SMB Alert
(2) 12V
(3) 12Vsb
(4) PWOK

	
OTP Turn on then OTP I/P:264Vac,O/P:Min load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK	OTP Turn on then OTP I/P:264Vac,O/P:Max load (1) SMB Alert (2) 12V (3) 12Vsb (4) PWOK

6. Control Signals
6.2 PSON

The PSON signal is required to remotely turn on/off the power supply. PSON is an active low signal that turns on the power rails. When this signal is not pulled low by the system, or left open, the outputs (except the standby voltage) turn OFF. In parallel standby mode a non- opertaining PSU (no line voltage or faulty) does not cause to switch ON the standby operating PSU via the PSON signal.

If this signal is left open the unit follows the PMBus commands.

Table14: PSON

PSON = Low	ON
PSON = Open	OFF or follows PMBus commands
PSON = High	OFF

	Min	**Max**
Logic level low (power supply ON)	0V	~~0.8V~~ 1V
Logic level high	2V	~~3.45V~~ 3.46V
Source current, V_{PSON} = low		4mA

6.1 PSON

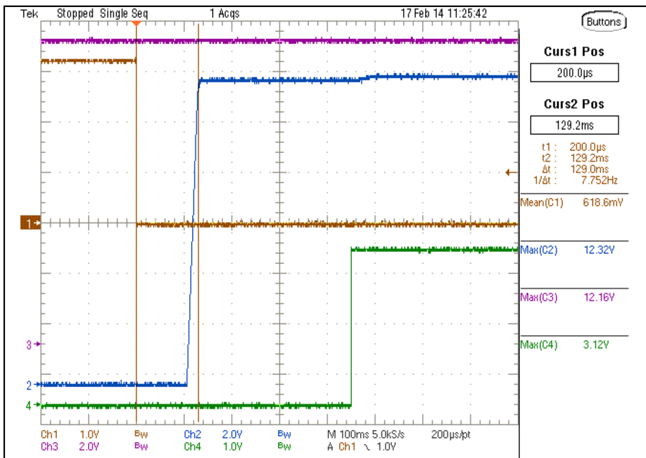
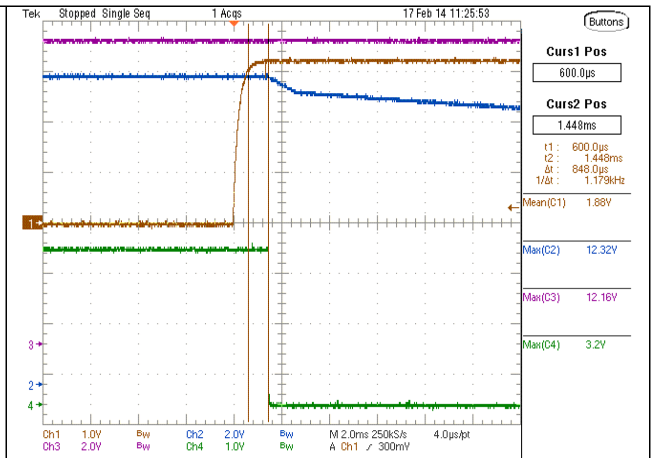
Test conditions:

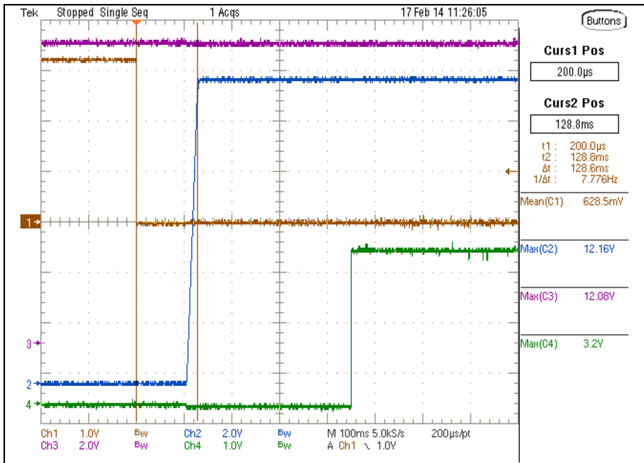
Sample NO. 1

AMB. 25℃

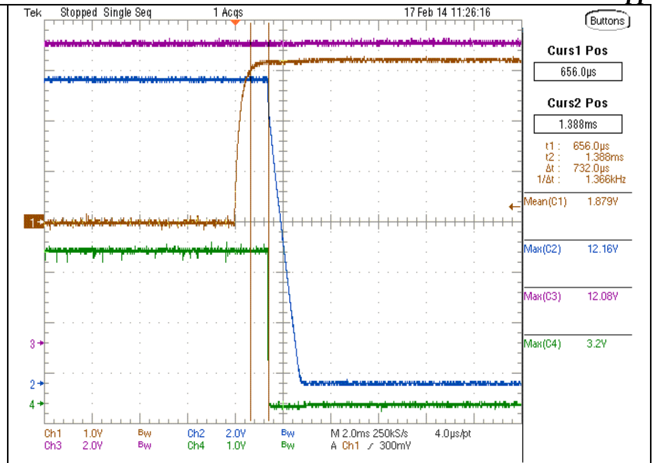
Graphical Result: PASS

Test Condition	PSON (Mean)	Result
PSON time Turn on(T7) ; I/P:90Vac,O/P:Min load	0.619	PASS
PSON time Turn off(T8) ; I/P:90Vac,O/P:Min load	1.880	PASS
PSON time Turn on(T7) ; I/P:90Vac,O/P:Max load	0.628	PASS
PSON time Turn off(T8) ; I/P:90Vac,O/P:Max load	1.879	PASS
PSON time Turn on(T7) ; I/P:100Vac,O/P:Min load	0.618	PASS
PSON time Turn off(T8) ; I/P:100Vac,O/P:Min load	1.880	PASS
PSON time Turn on(T7) ; I/P:100Vac,O/P:Max load	0.627	PASS
PSON time Turn off(T8) ; I/P:100Vac,O/P:Max load	1.880	PASS
PSON time Turn on(T7) ; I/P:200Vac,O/P:Min load	0.617	PASS
PSON time Turn off(T8) ; I/P:200Vac,O/P:Min load	1.880	PASS
PSON time Turn on(T7) ; I/P:200Vac,O/P:Max load	0.629	PASS
PSON time Turn off(T8) ; I/P:200Vac,O/P:Max load	1.881	PASS
PSON time Turn on(T7) ; I/P:264Vac,O/P:Min load	0.617	PASS
PSON time Turn off(T8) ; I/P:264Vac,O/P:Min load	1.879	PASS
PSON time Turn on(T7) ; I/P:264Vac,O/P:Max load	0.628	PASS
PSON time Turn off(T8) ; I/P:264Vac,O/P:Max load	1.879	PASS

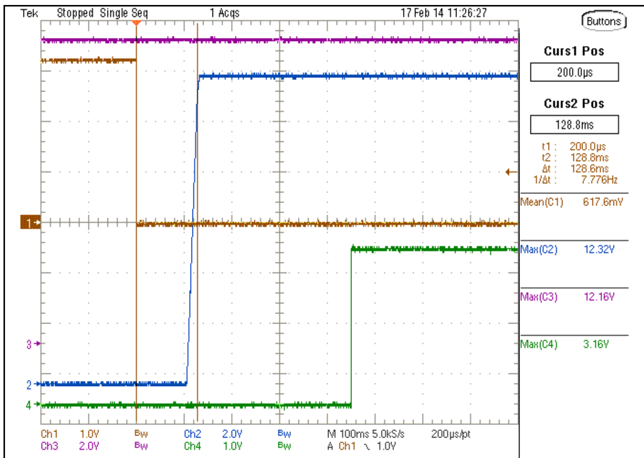
	
PSON time Turn on(T7) ; I/P:90Vac,O/P:Min load (1) PSON (2) 12V (3) 12Vsb (4) PWOK	PSON time Turn off(T8) ; I/P:90Vac,O/P:Min load (1) PSON (2) 12V (3) 12Vsb (4) PWOK



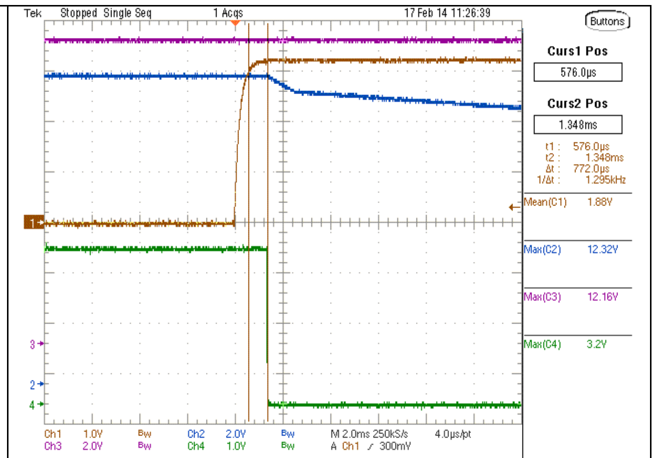
PSON time Turn on(T7) ; I/P:90Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



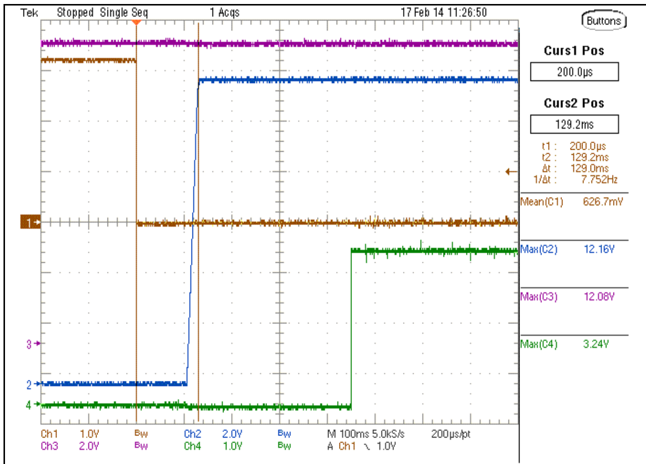
PSON time Turn off(T8) ; I/P:90Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



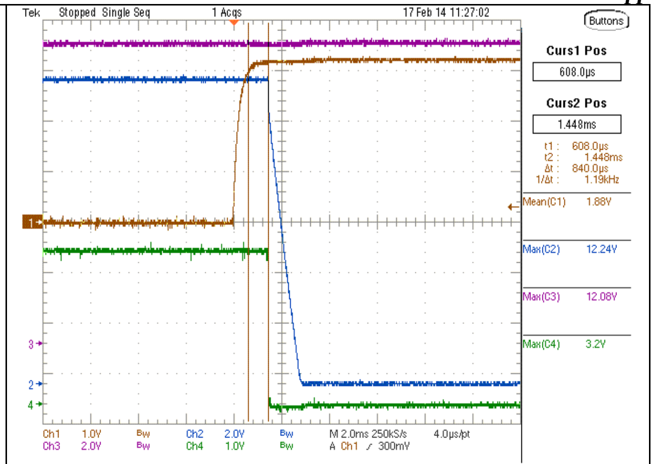
PSON time Turn on(T7) ; I/P:100Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



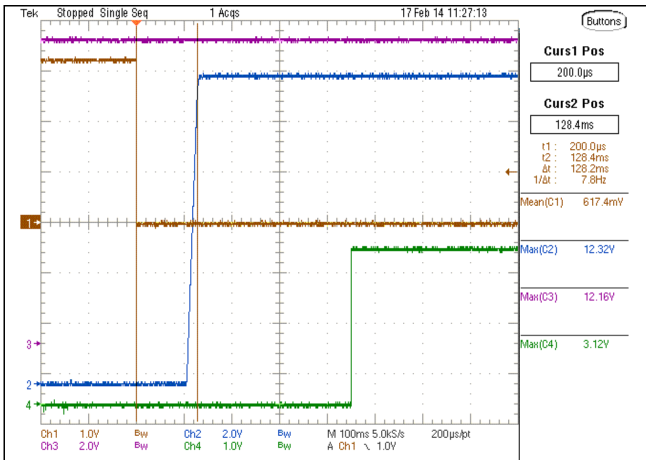
PSON time Turn off(T8) ; I/P:100Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



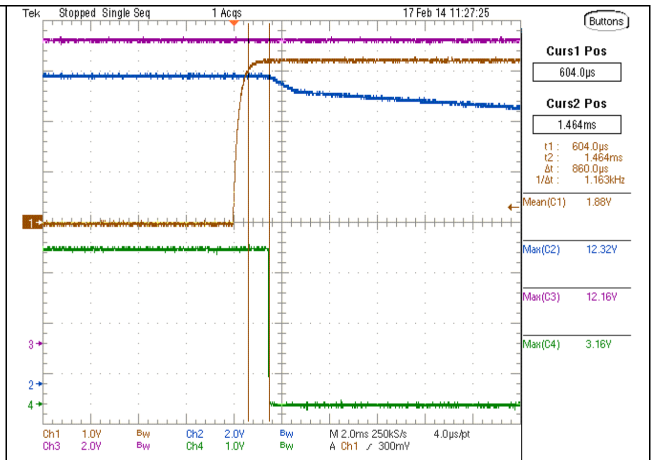
PSON time Turn on(T7) ; I/P:100Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



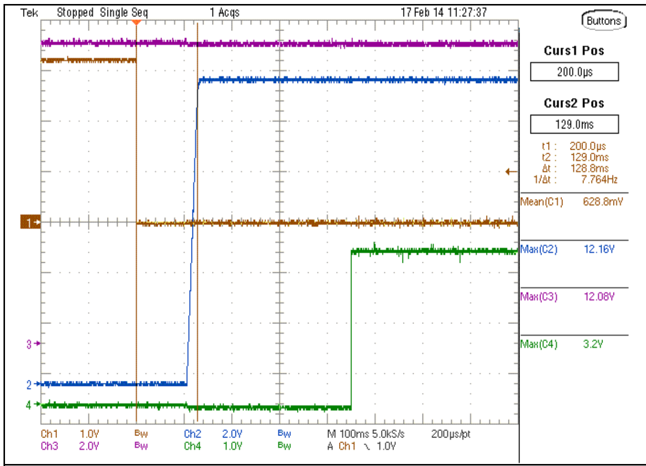
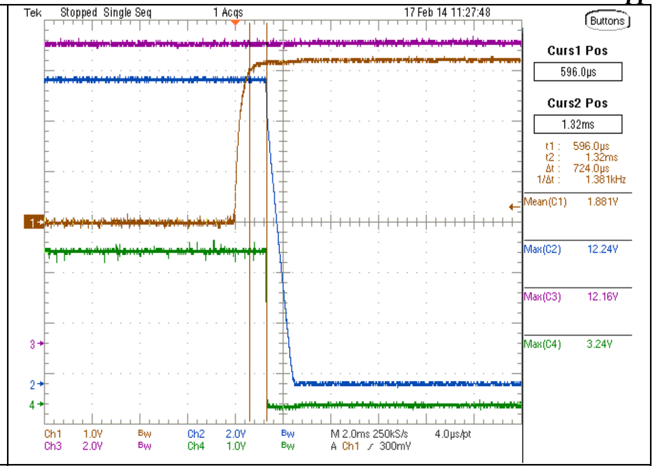
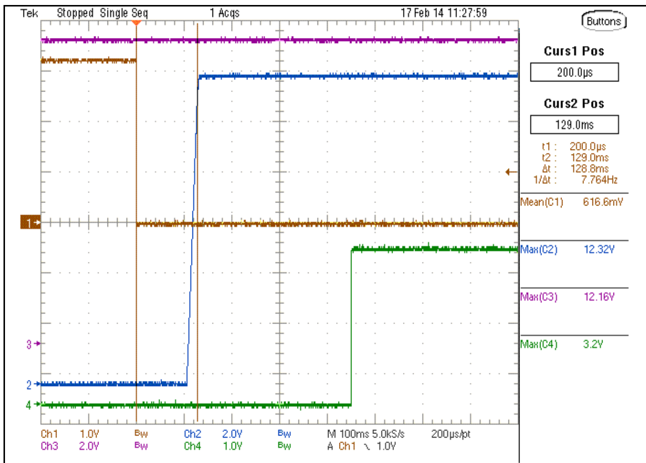
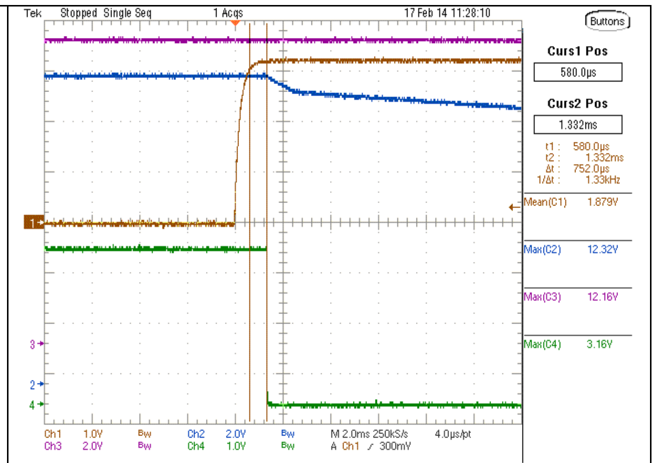
PSON time Turn off(T8) ; I/P:100Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn on(T7) ; I/P:200Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn off(T8) ; I/P:200Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK

	
PSON time Turn on(T7) ; I/P:200Vac,O/P:Max load (1) PSON (2) 12V (3) 12Vsb (4) PWOK	PSON time Turn off(T8) ; I/P:200Vac,O/P:Max load (1) PSON (2) 12V (3) 12Vsb (4) PWOK
	
PSON time Turn on(T7) ; I/P:264Vac,O/P:Min load (1) PSON (2) 12V (3) 12Vsb (4) PWOK	PSON time Turn off(T8) ; I/P:264Vac,O/P:Min load (1) PSON (2) 12V (3) 12Vsb (4) PWOK

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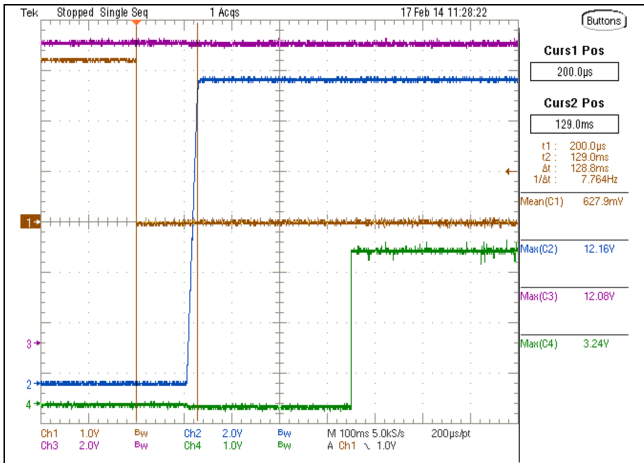
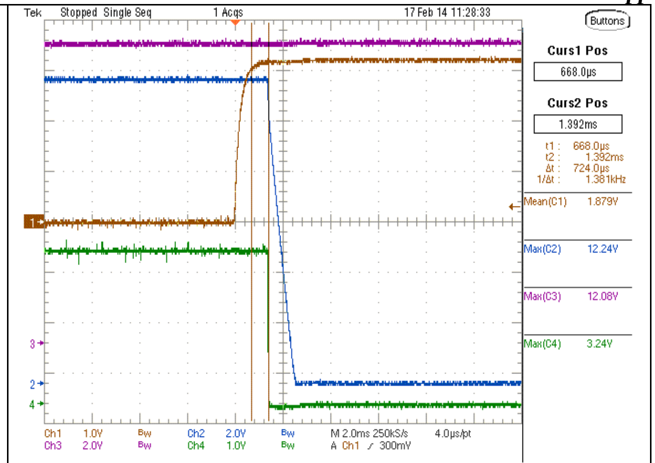
<td></td>
<td></td>
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<tr>
<td>PSON time Turn on(T7) ; I/P:264Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK</td>
<td>PSON time Turn off(T8) ; I/P:264Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK</td>
</tr>
</table>

6.1 PSON

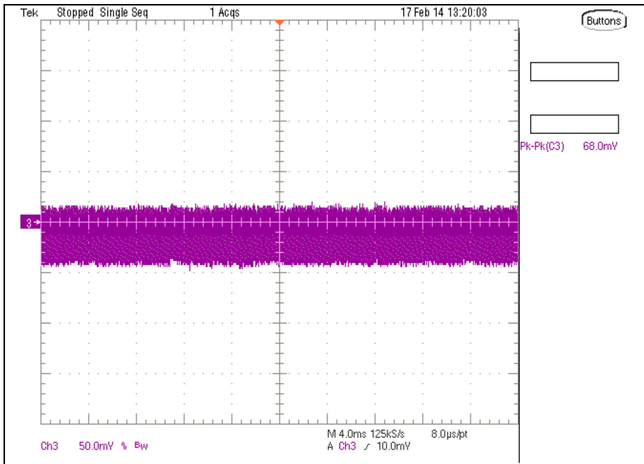
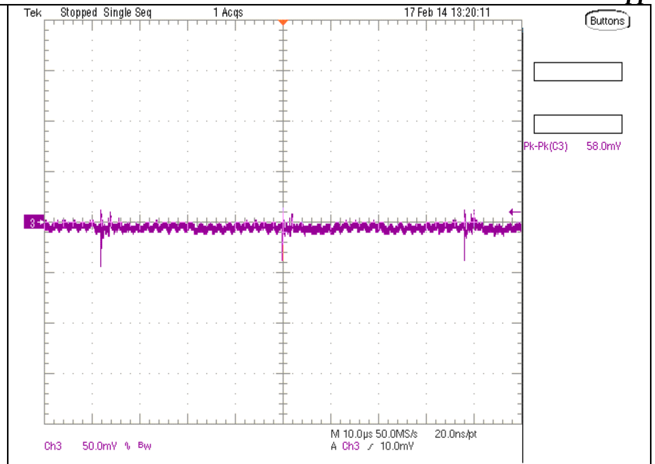
Test conditions:

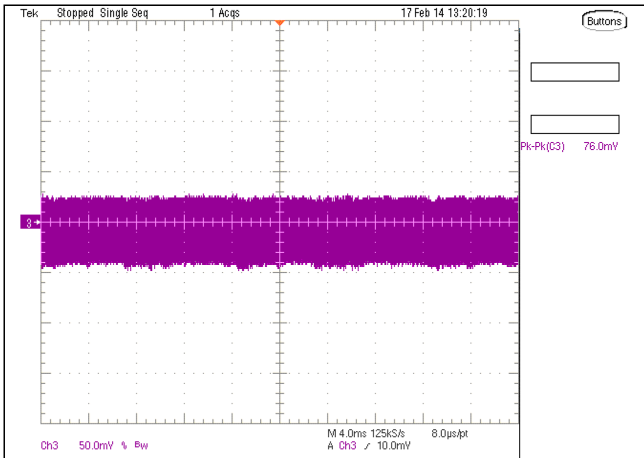
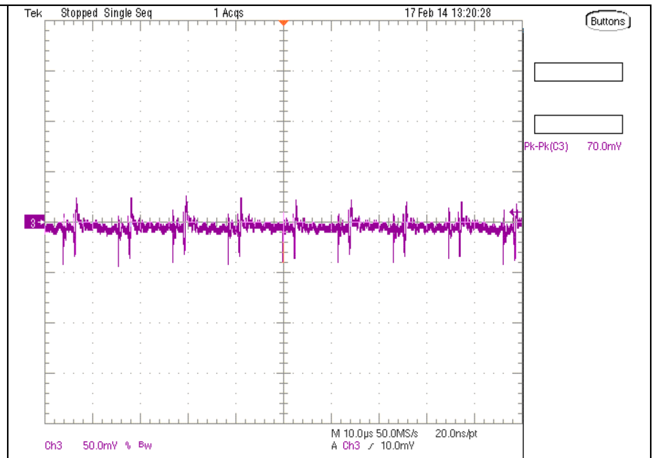
Sample NO. 1

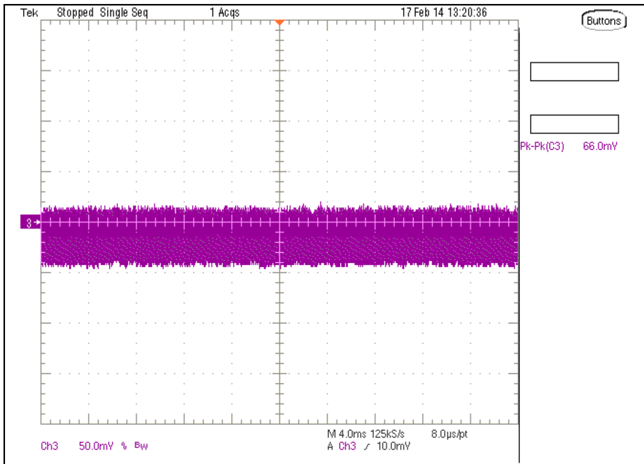
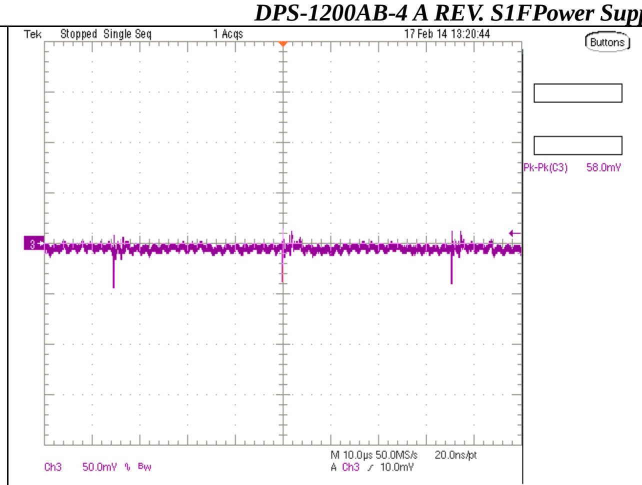
AMB. 25℃

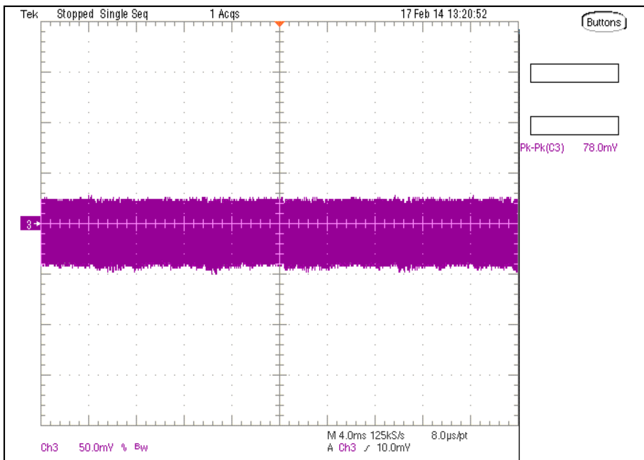
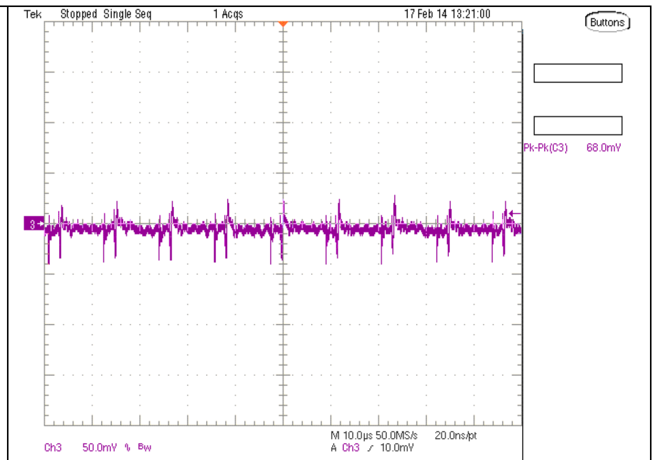
Graphical Result: PASS

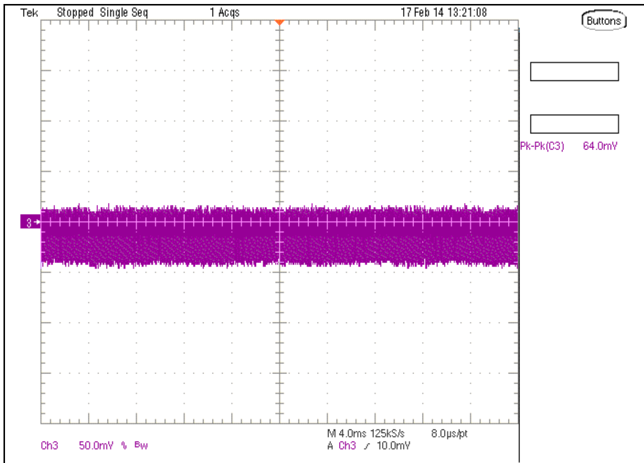
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
PSON PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	68.0	PASS
PSON PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	58.0	PASS
PSON PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	76.0	PASS
PSON PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	70.0	PASS
PSON PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	66.0	PASS
PSON PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	58.0	PASS
PSON PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	78.0	PASS
PSON PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	68.0	PASS
PSON PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	64.0	PASS
PSON PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	56.0	PASS
PSON PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	76.0	PASS
PSON PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	64.0	PASS
PSON PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	64.0	PASS
PSON PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	52.0	PASS
PSON PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	74.0	PASS
PSON PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	64.0	PASS

	
PSON PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz. CH3: PSON Vp-p →High	PSON PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz. CH3: PSON Vp-p →High

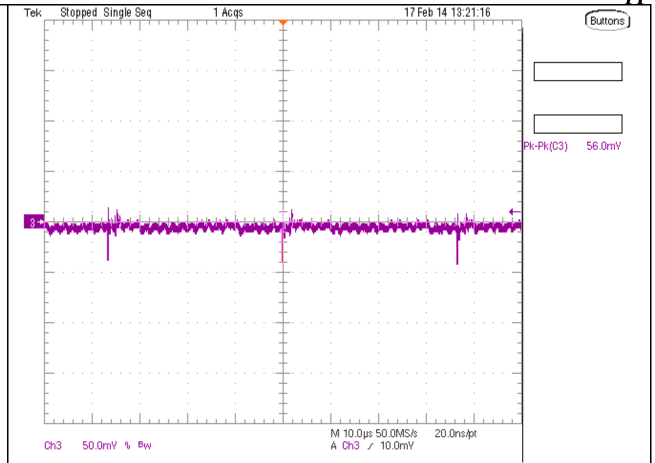
	
PSON PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz. CH3: PSON Vp-p →High	PSON PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz. CH3: PSON Vp-p →High

	
PSON PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz. CH3: PSON Vp-p →High	PSON PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz. CH3: PSON Vp-p →High

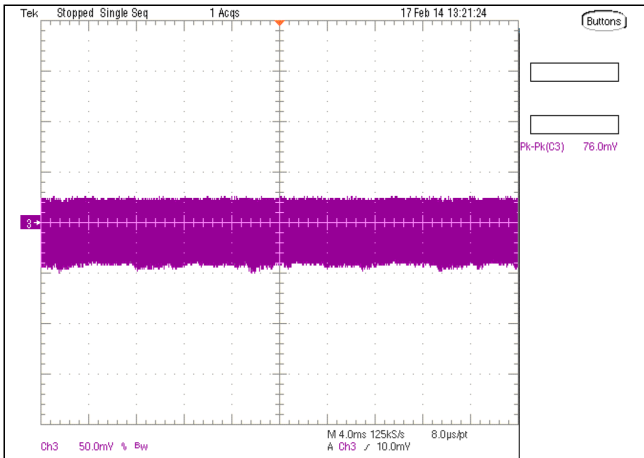
	
PSON PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz. CH3: PSON Vp-p →High	PSON PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz. CH3: PSON Vp-p →High



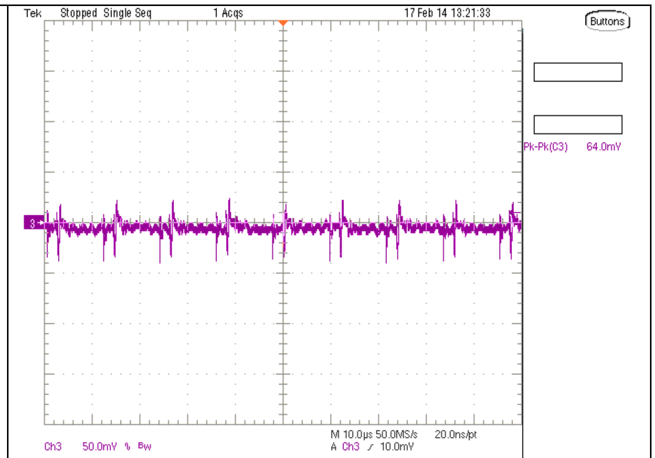
PSON PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSON Vp-p →High



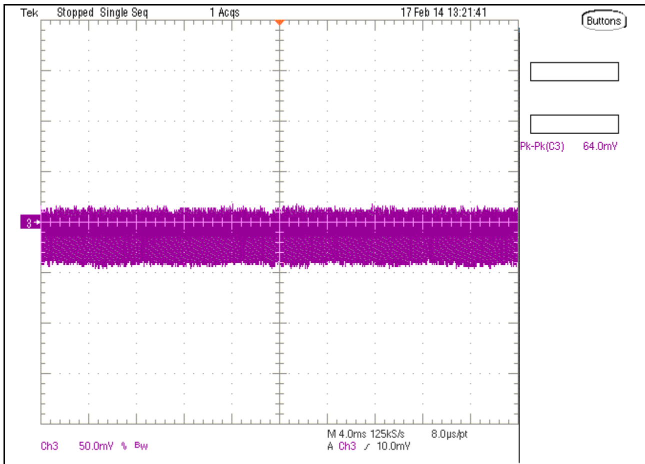
PSON PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSON Vp-p →High



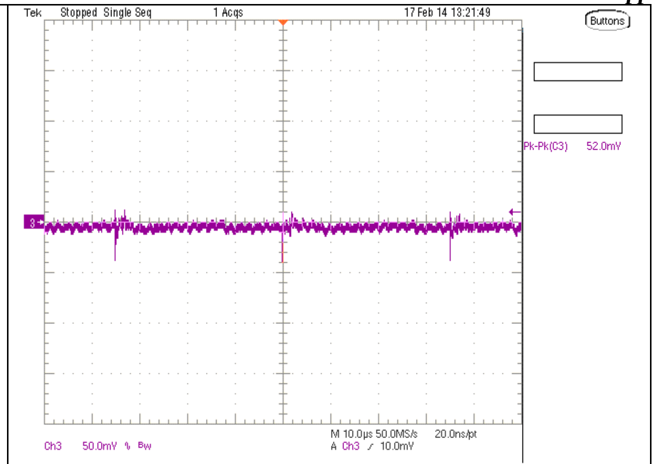
PSON PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSON Vp-p →High



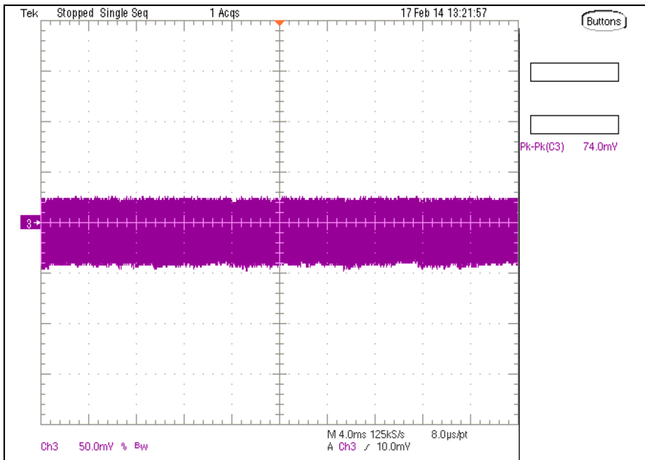
PSON PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSON Vp-p→ →High



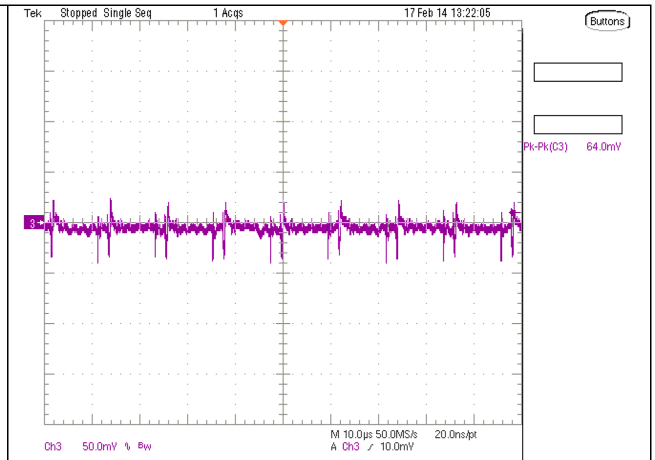
PSON PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSON Vp-p →High



PSON PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSON Vp-p →High



PSON PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSON Vp-p →High



PSON PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSON Vp-p →High

6.1 PSON

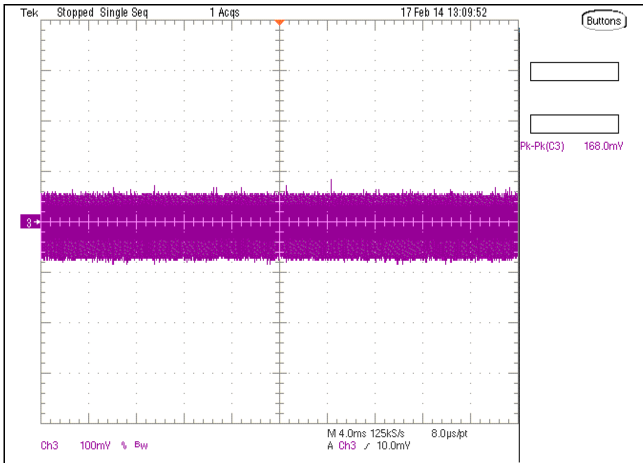
Test conditions:

Sample NO. 1

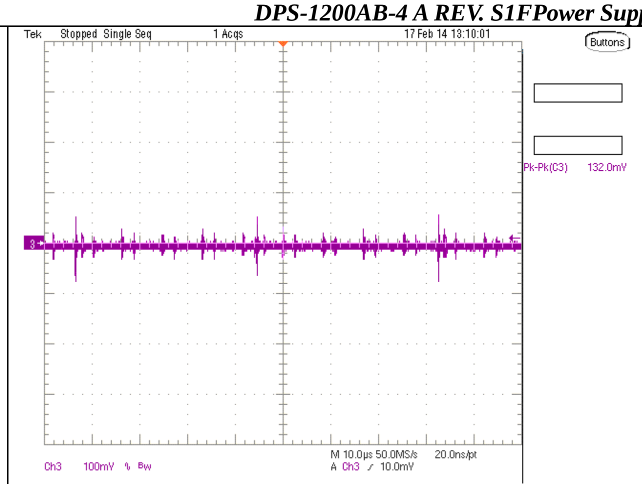
AMB. 25℃

Graphical Result: PASS

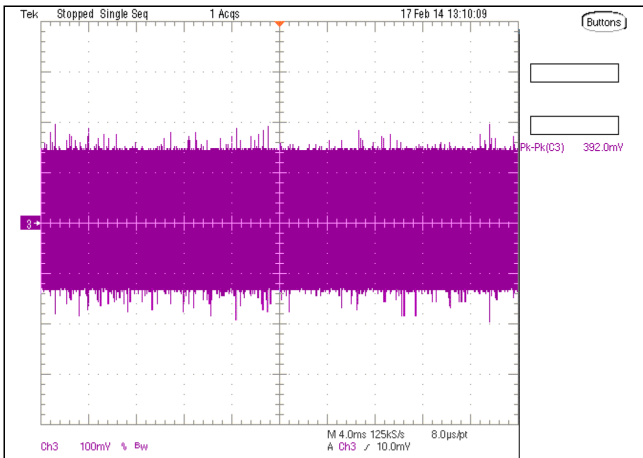
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
PSON PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	168.0	PASS
PSON PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	132.0	PASS
PSON PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	392.0	PASS
PSON PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	276.0	PASS
PSON PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	164.0	PASS
PSON PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	128.0	PASS
PSON PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	388.0	PASS
PSON PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	272.0	PASS
PSON PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	172.0	PASS
PSON PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	132.0	PASS
PSON PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	380.0	PASS
PSON PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	304.0	PASS
PSON PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	160.0	PASS
PSON PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	124.0	PASS
PSON PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	376.0	PASS
PSON PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	280.0	PASS



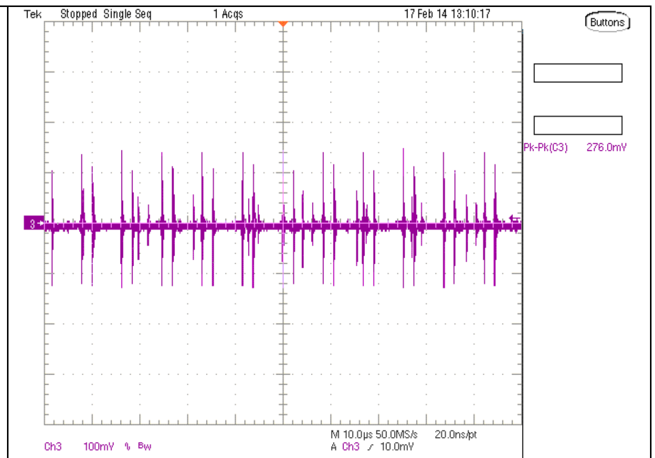
PSON PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz.
CH3: PSON Vp-p →Low



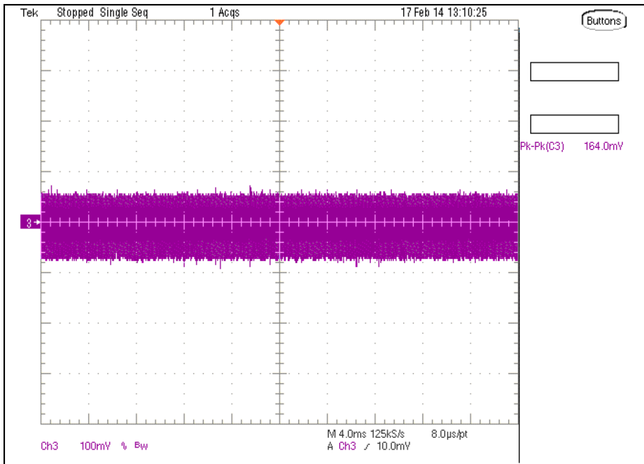
PSON PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz.
CH3: PSON Vp-p →Low



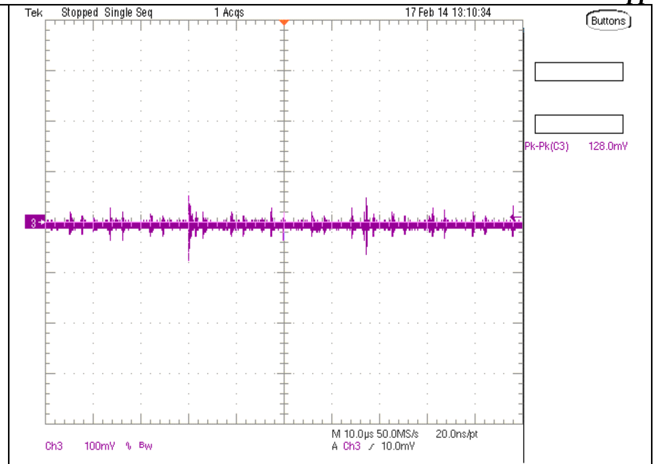
PSON PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz.
CH3: PSON Vp-p →Low



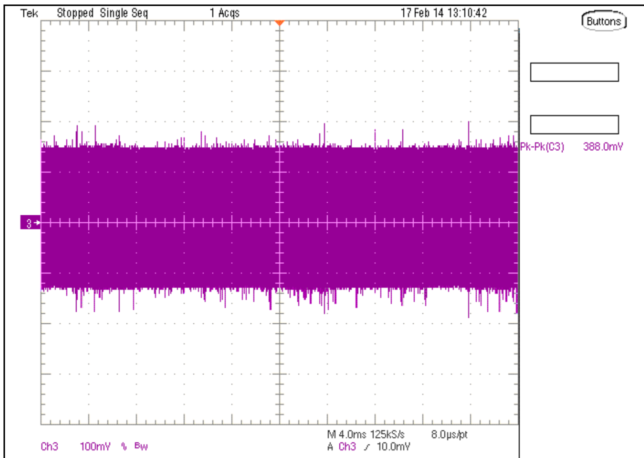
PSON PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz.
CH3: PSON Vp-p →Low



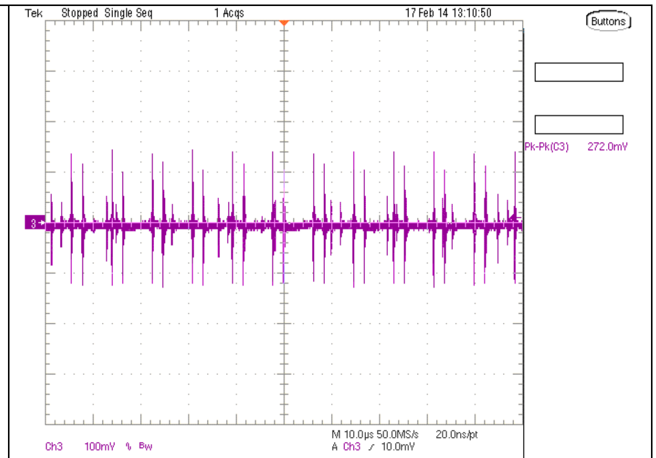
PSON PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.
CH3: PSON Vp-p →Low



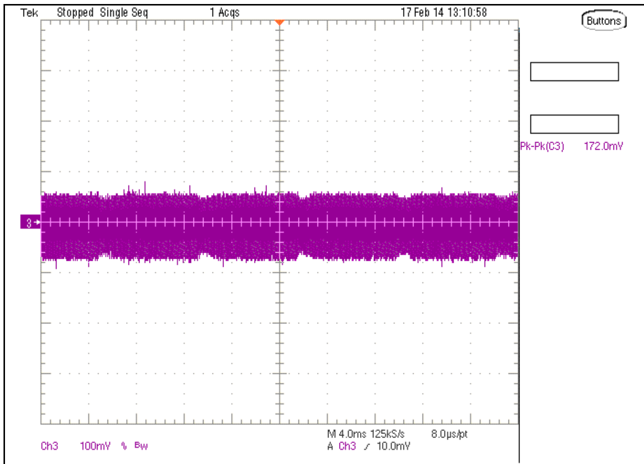
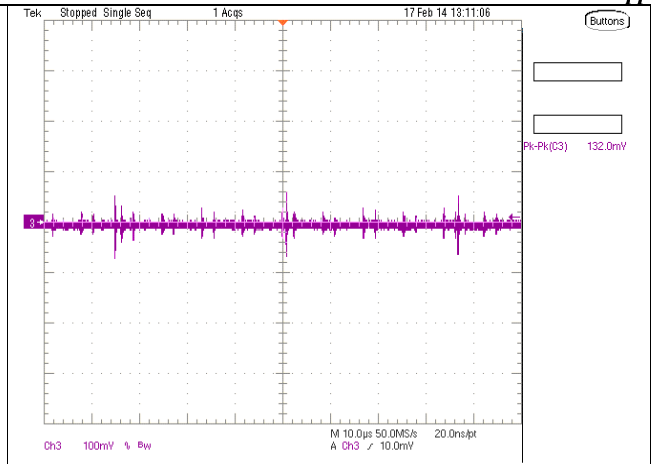
PSON PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.
CH3: PSON Vp-p →Low

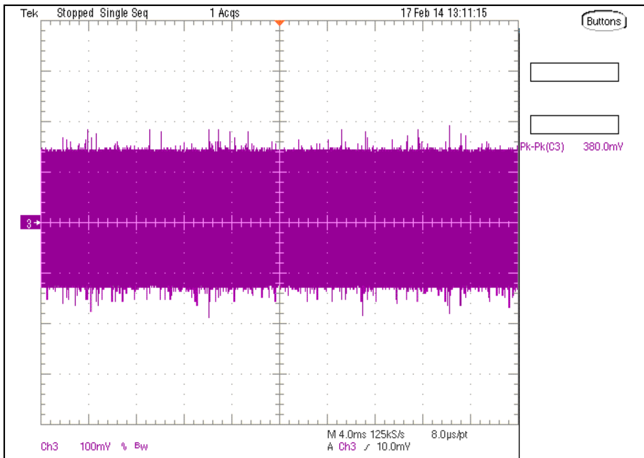
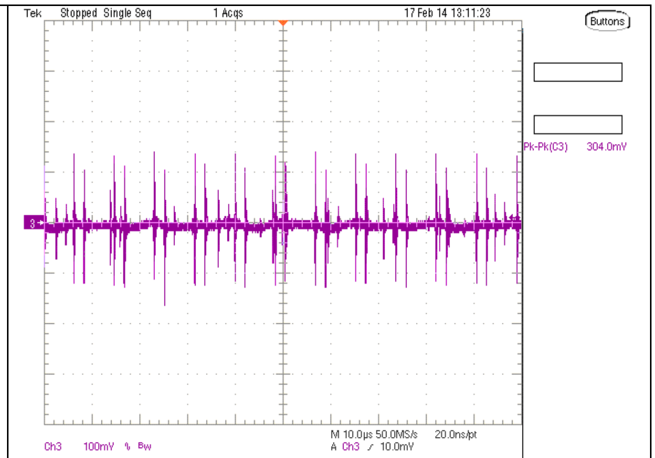


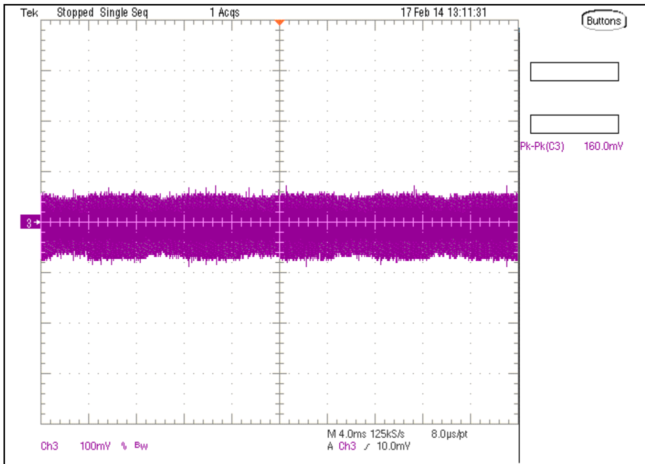
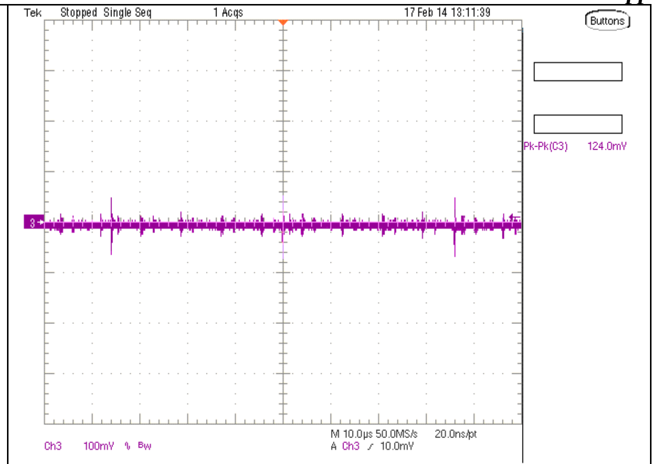
PSON PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.
CH3: PSON Vp-p →Low

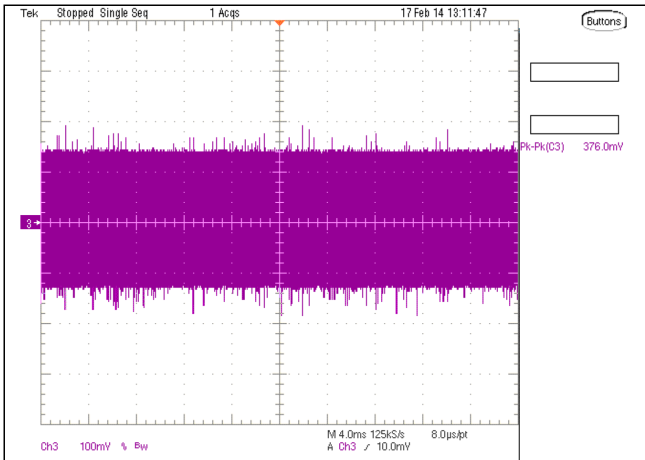
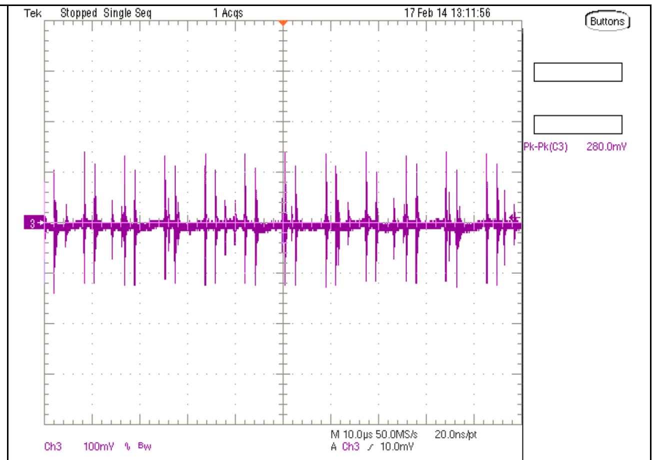


PSON PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.
CH3: PSON Vp-p →Low

	
PSON PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz. CH3: PSON Vp-p →Low	PSON PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz. CH3: PSON Vp-p →Low

	
PSON PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz. CH3: PSON Vp-p →Low	PSON PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz. CH3: PSON Vp-p →Low

	
PSON PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz. CH3: PSON Vp-p →Low	PSON PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz. CH3: PSON Vp-p →Low

	
PSON PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz. CH3: PSON Vp-p → Low	PSON PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz. CH3: PSON Vp-p →Low

6.3 PSKILL

The purpose of the PSKILL pin is to allow for hot swapping of the power supply. The PSKILL pin on the power supply is shorter than the other signal pins. When a power supply is operating in parallel with other power supplies and then extracted from the system, the PSKILL pin will quickly turn off the power supply and prevent arching of the DC output contacts. The DC output contacts must not arch under this condition. When the PSKILL signal pin is not pulled down or left opened (power supply is extracting from the system), the power supply shuts down regardless of the PMBus on command. The mating pin of this signal in the system should be tied to ground. Internal to the power supply, the PSKILL pin is connected to an internal voltage through a pull-up resistor. Upon receiving a LOW state signal at the PSKILL pin, the power supply will be allowed to turn on via a PMBus command. A logic LOW on this pin by itself does not turn on the power outputs.

Table15: PSKILL

PSKILL = Low, PMBus commant= ON	ON
PSKILL = Open/High, PSOFF = LOW	OFF
PSKILL = Open, PMBus commant = ON	OFF
PSKILL = High, PMBus commant=ON	OFF

	Min	**Max**
Logic level low	0V	0.4V
Logic level high	2V	~~3.45V~~ 3.46V
Source current in low state		4mA

6.2 PSKILL

Test conditions:

Sample NO.1

AMB. 25℃

Graphical Result: PASS

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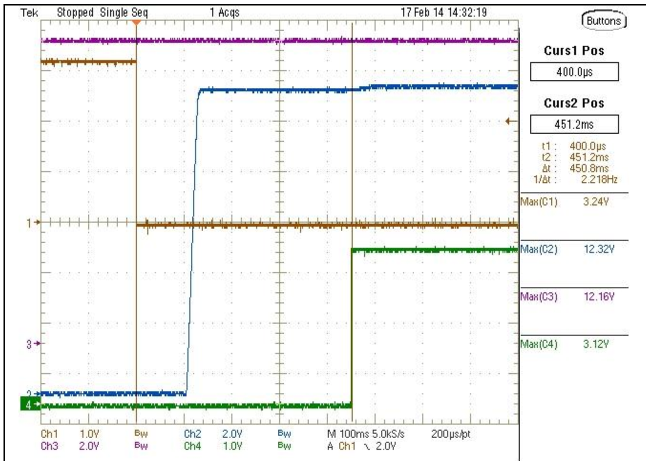
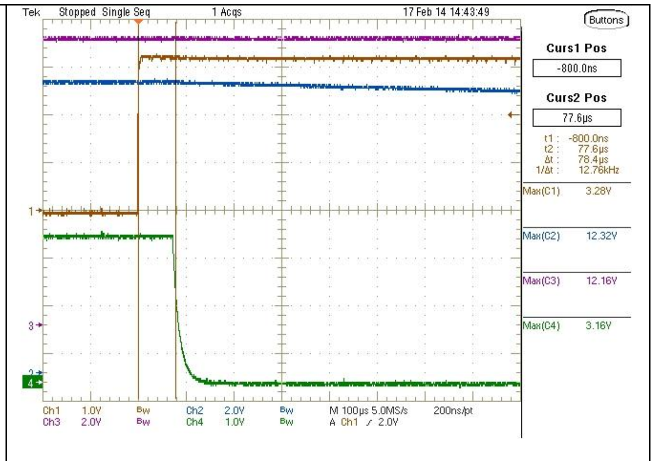
<tr><td></td><td></td></tr>
<tr><td>PSKILL time Turn on; I/P:90Vac,O/P:Min load
(1) PSKILL
(2) 12V
(3) 12Vsb
(4) PWOK</td><td>PSKILL time Turn off; I/P:90Vac,O/P:Min load
(1) PSKILL
(2) 12V
(3) 12Vsb
(4) PWOK</td></tr>
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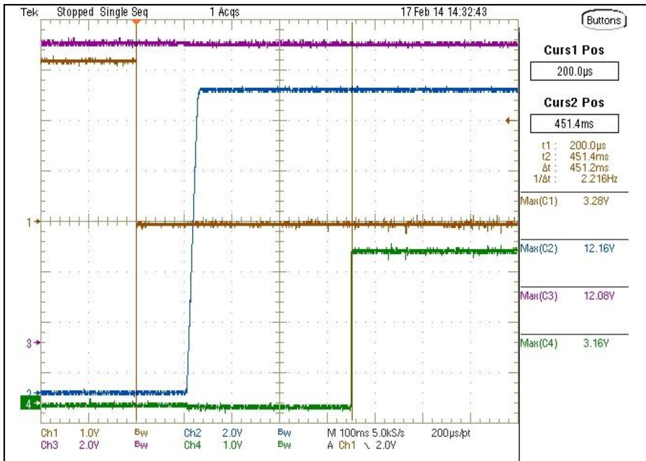
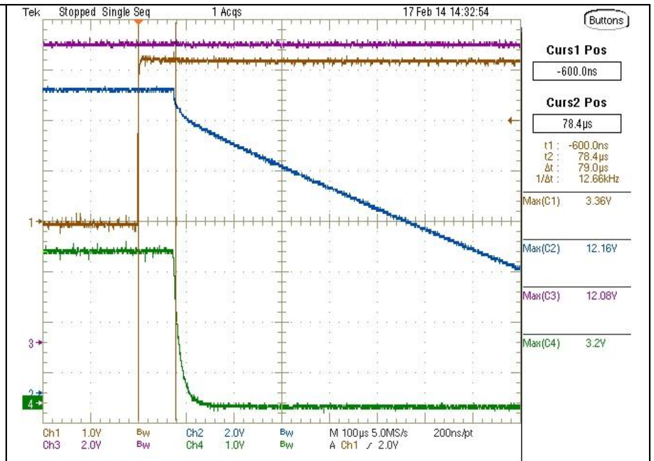
<tr><td></td><td></td></tr>
<tr><td>PSKILL time Turn on; I/P:90Vac,O/P:Max load
(1) PSKILL
(2) 12V
(3) 12Vsb
(4) PWOK</td><td>PSKILL time Turn off; I/P:90Vac,O/P:Max load
(1) PSKILL
(2) 12V
(3) 12Vsb
(4) PWOK</td></tr>
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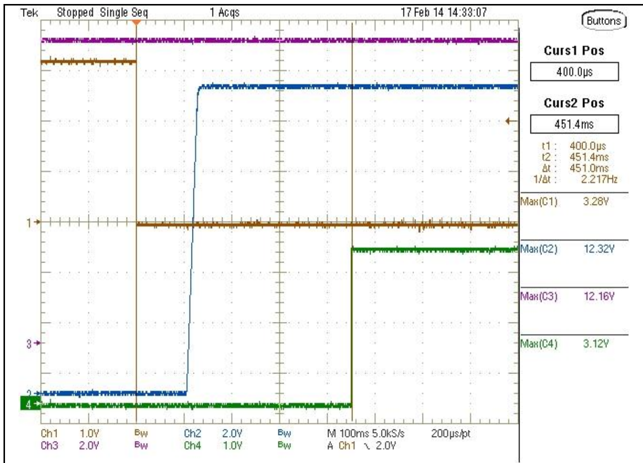
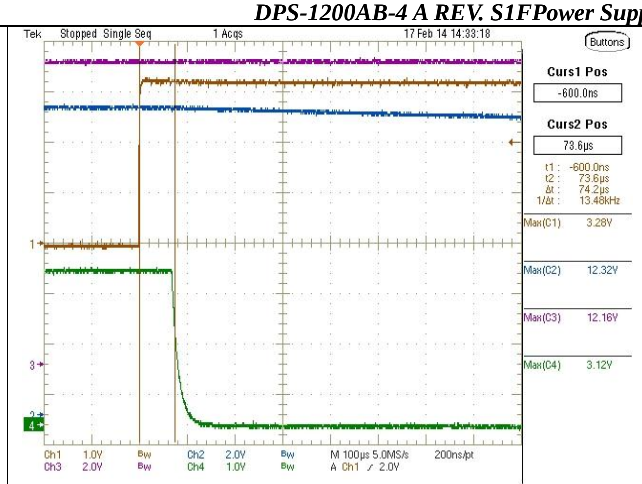
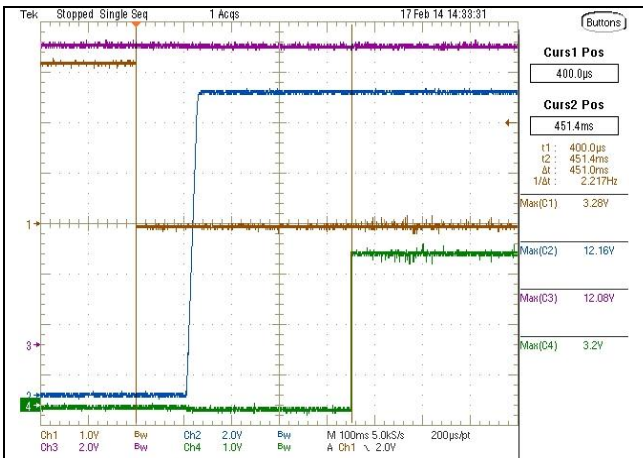
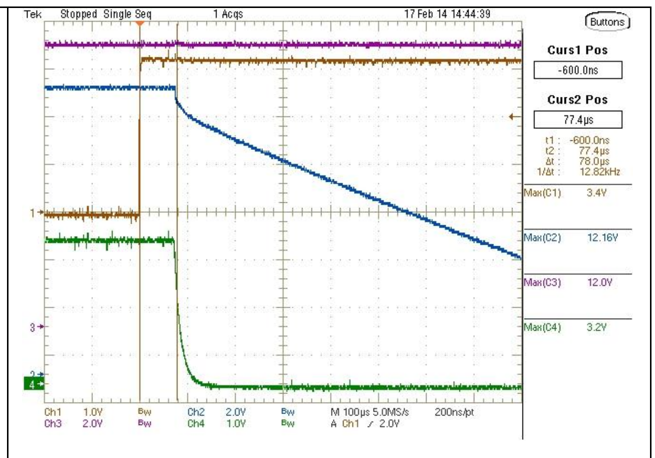
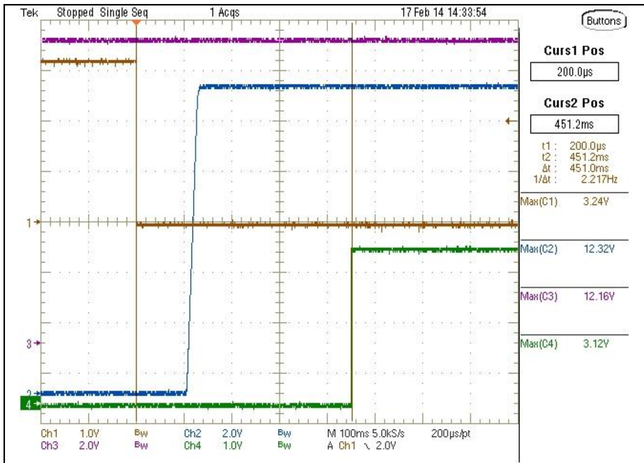
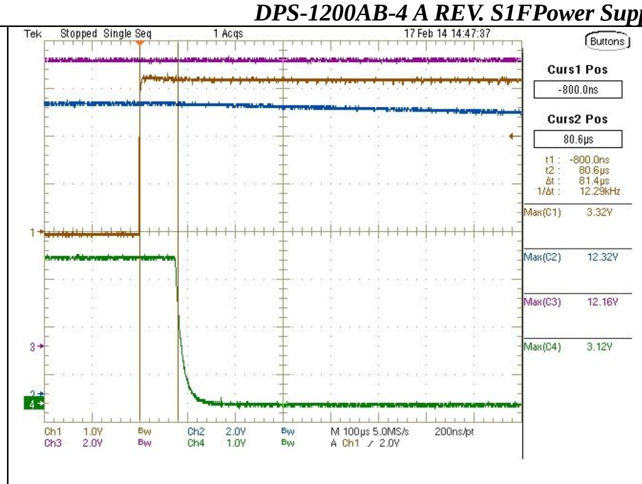
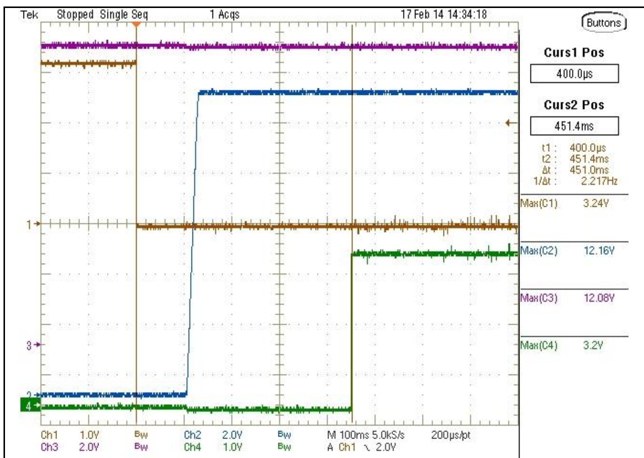
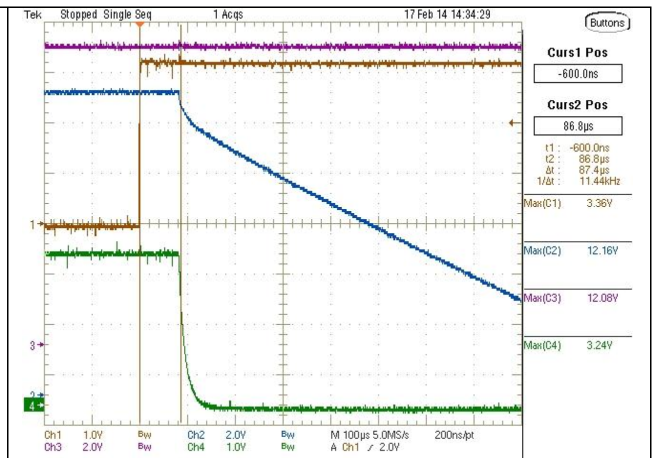
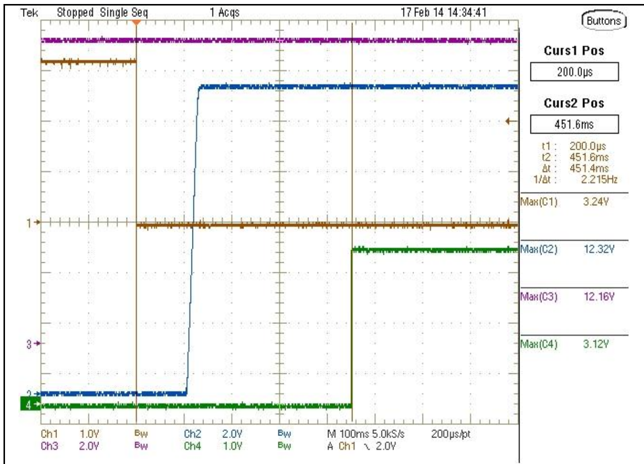
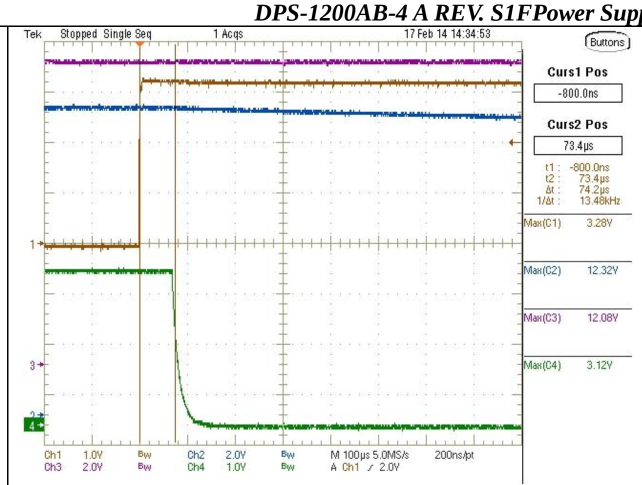
	
PSKILL time Turn on; I/P:100Vac,O/P:Min load (1) PSKILL (2) 12V (3) 12Vsb (4) PWOK	PSKILL time Turn off; I/P:100Vac,O/P:Min load (1) PSKILL (2) 12V (3) 12Vsb (4) PWOK

	
PSKILL time Turn on; I/P:100Vac,O/P:Max load (1) PSKILL (2) 12V (3) 12Vsb (4) PWOK	PSKILL time Turn off; I/P:100Vac,O/P:Max load (1) PSKILL (2) 12V (3) 12Vsb (4) PWOK

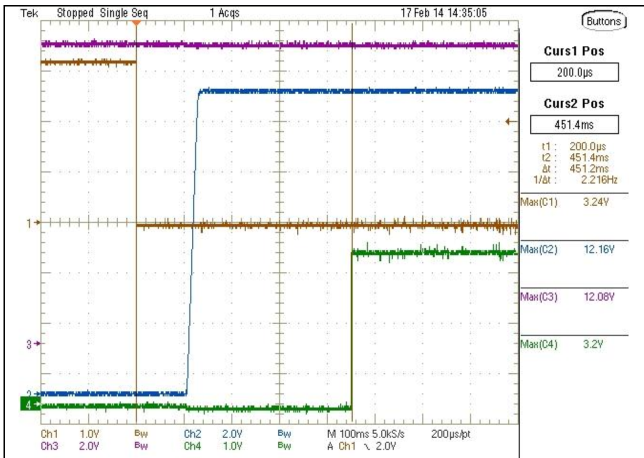
	
PSKILL time Turn on; I/P:200Vac,O/P:Min load (1) PSKILL (2) 12V (3) 12Vsb (4) PWOK	PSKILL time Turn off; I/P:200Vac,O/P:Min load (1) PSKILL (2) 12V (3) 12Vsb (4) PWOK
	
PSKILL time Turn on; I/P:200Vac,O/P:Max load (1) PSKILL (2) 12V (3) 12Vsb (4) PWOK	PSKILL time Turn off; I/P:200Vac,O/P:Max load (1) PSKILL (2) 12V (3) 12Vsb (4) PWOK



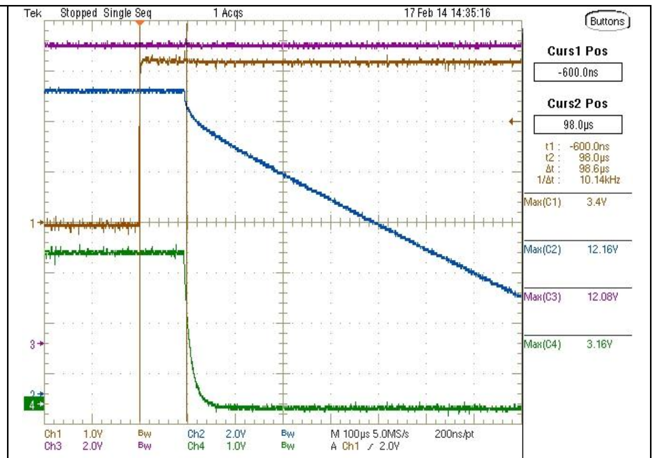
PSKILL time Turn on; I/P:264Vac,O/P:Min load
(1) PSKILL
(2) 12V
(3) 12Vsb
(4) PWOK



PSKILL time Turn off; I/P:264Vac,O/P:Min load
(1) PSKILL
(2) 12V
(3) 12Vsb
(4) PWOK



PSKILL time Turn on; I/P:264Vac,O/P:Max load
(1) PSKILL
(2) 12V
(3) 12Vsb
(4) PWOK



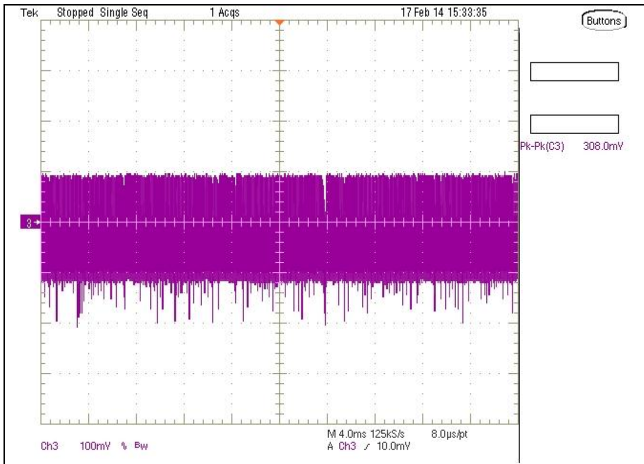
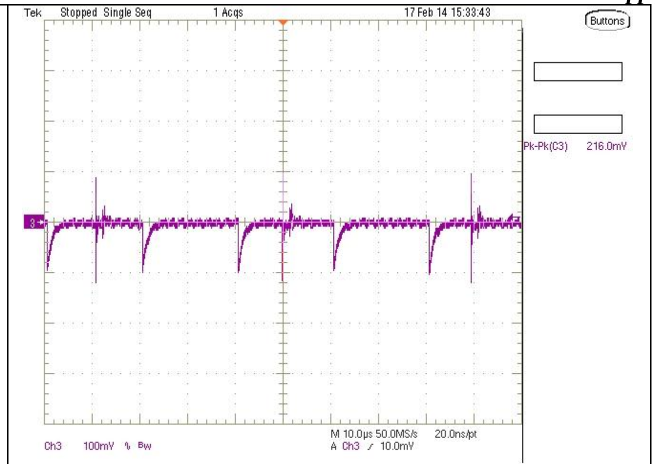
PSKILL time Turn off; I/P:264Vac,O/P:Max load
(1) PSKILL
(2) 12V
(3) 12Vsb
(4) PWOK

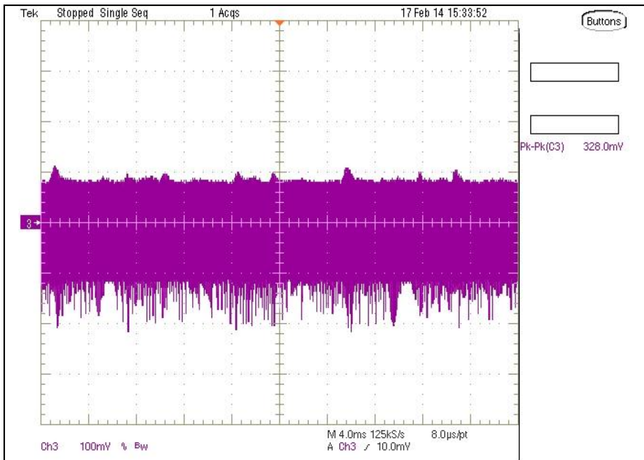
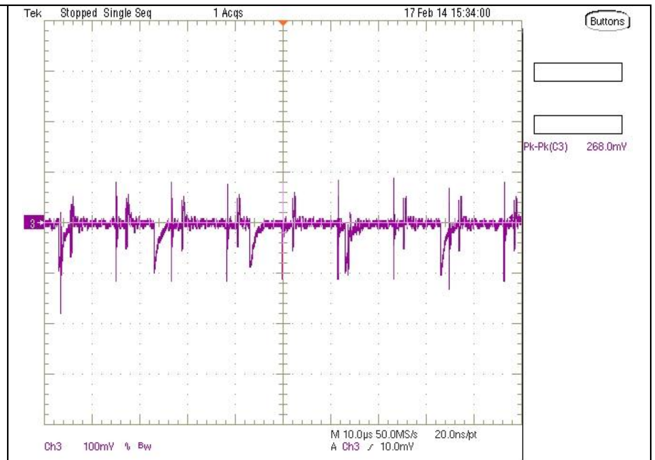
6.2 PSKILL

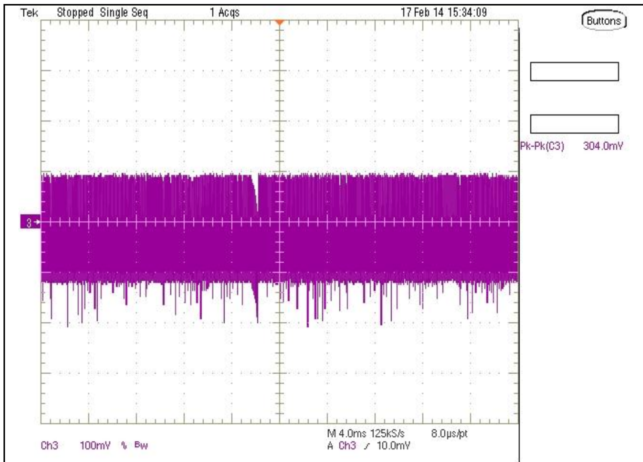
Test conditions:
Sample NO.1
AMB. 25℃

Graphical Result: PASS

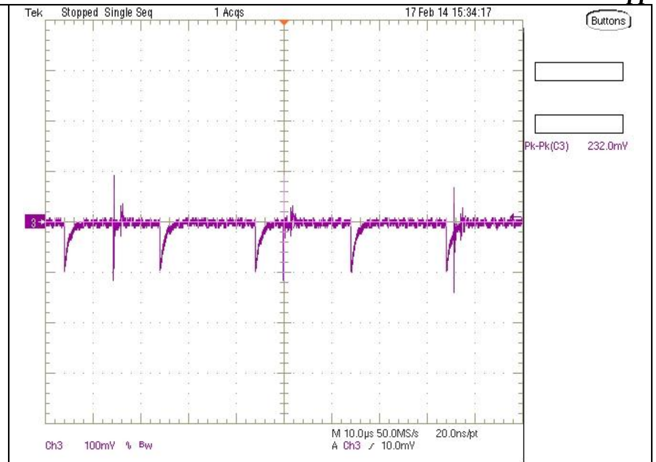
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	308.0	PASS
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	216.0	PASS
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	328.0	PASS
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	268.0	PASS
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	304.0	PASS
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	232.0	PASS
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	332.0	PASS
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	224.0	PASS
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	312.0	PASS
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	192.0	PASS
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	324.0	PASS
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	224.0	PASS
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	312.0	PASS
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.	*	208.0	PASS
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	308.0	PASS
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.	*	204.0	PASS

	
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz. CH3: PSKILL Vp-p High	PSKILL PARD; I/P: 90Vac/47Hz,O/P: Min load (Standby Mode) BW: 20MHz. CH3: PSKILL Vp-p High

	
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz. CH3: PSKILL Vp-p High	PSKILL PARD; I/P: 90Vac/47Hz,O/P: Max load (Standby Mode) BW: 20MHz. CH3: PSKILL Vp-p High



PSKILL PARD; I/P: 100Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High



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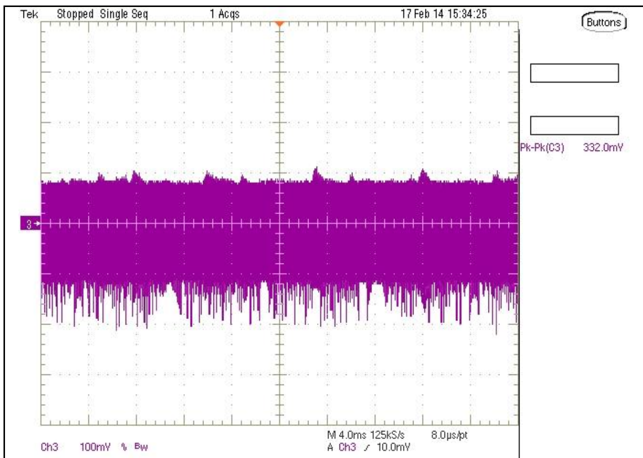
CH3: PSKILL Vp-p High



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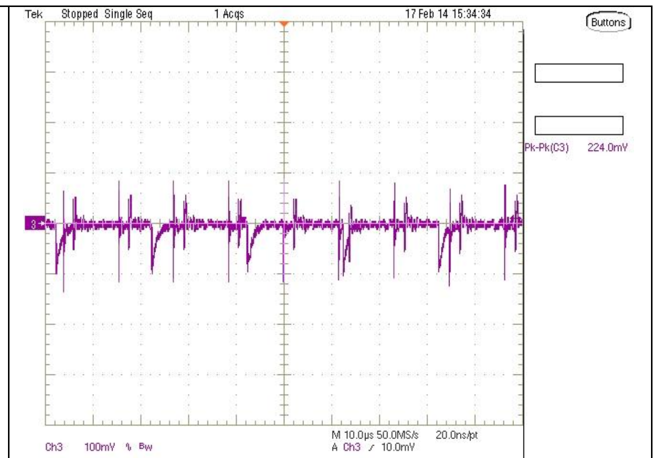
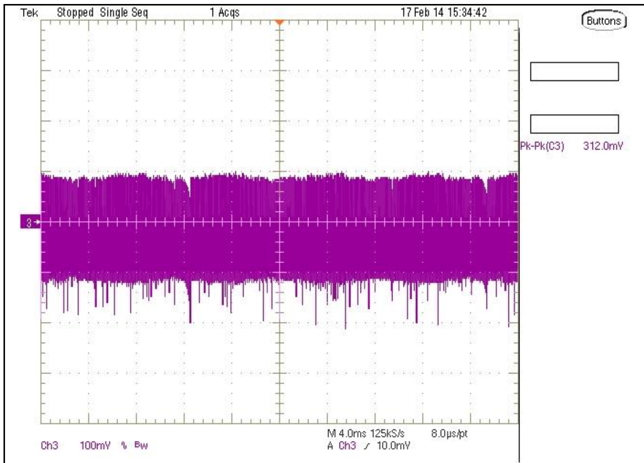
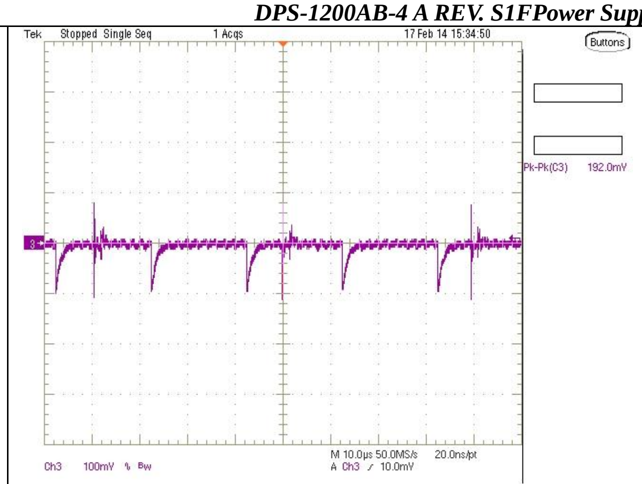
CH3: PSKILL Vp-p High



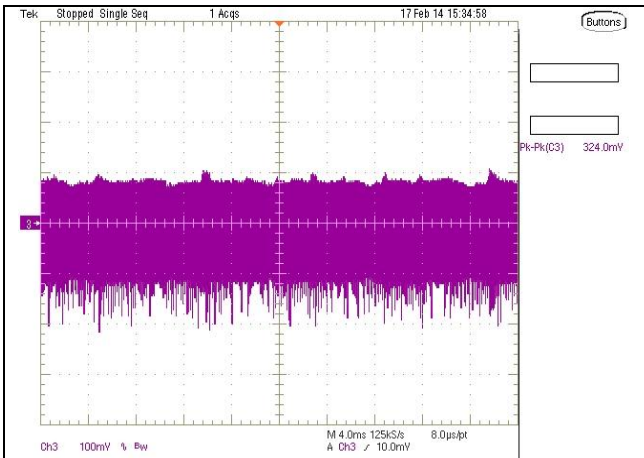
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High



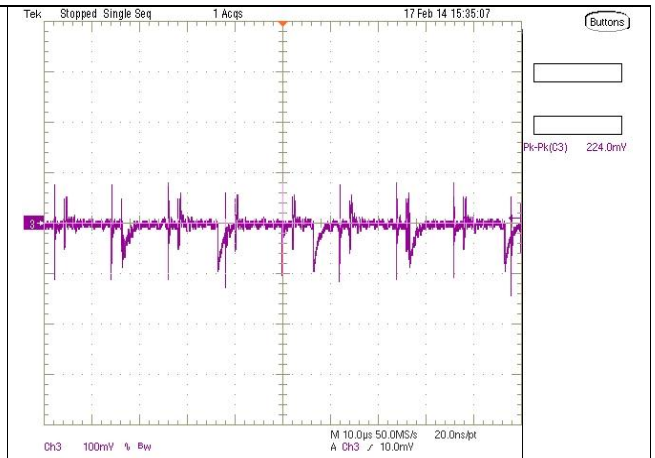
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High



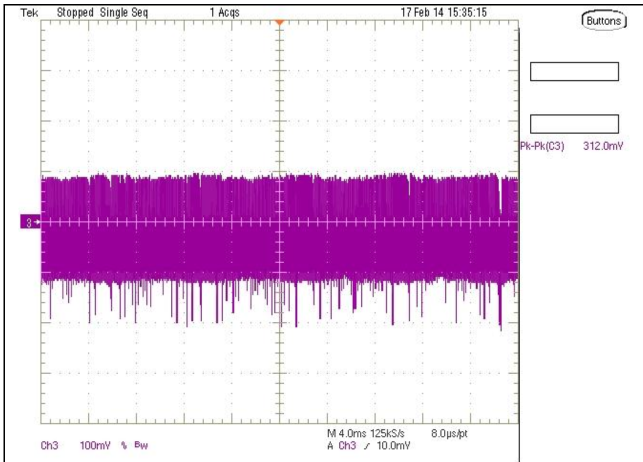
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High



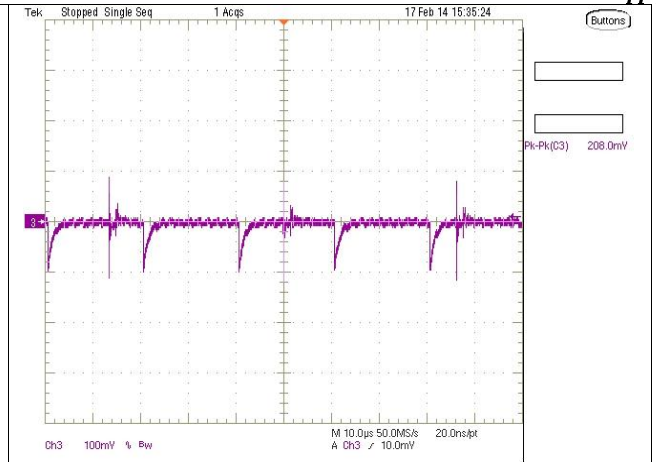
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High



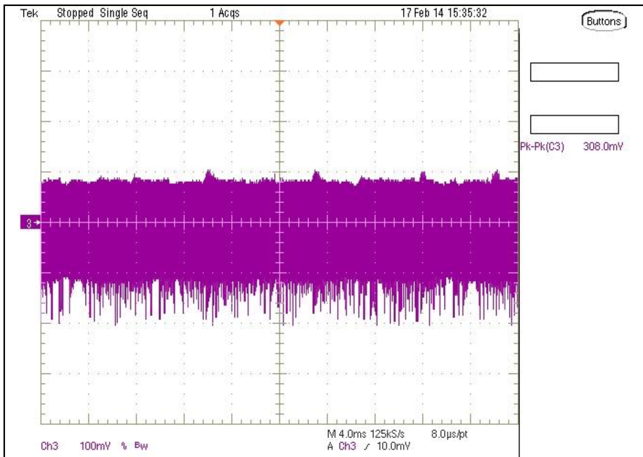
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High



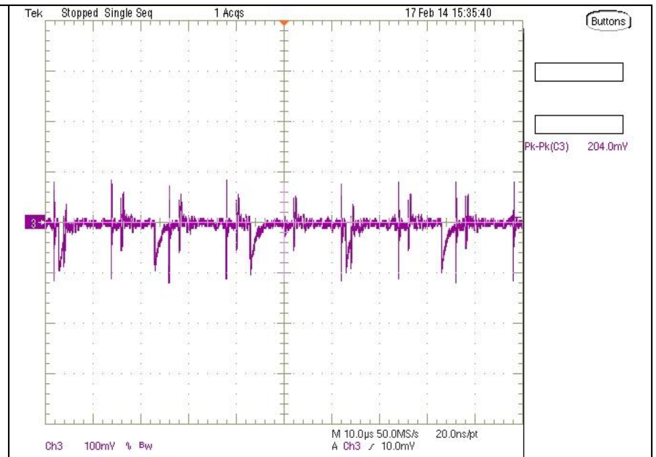
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High



PSKILL PARD; I/P: 264Vac/63Hz,O/P: Min load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High

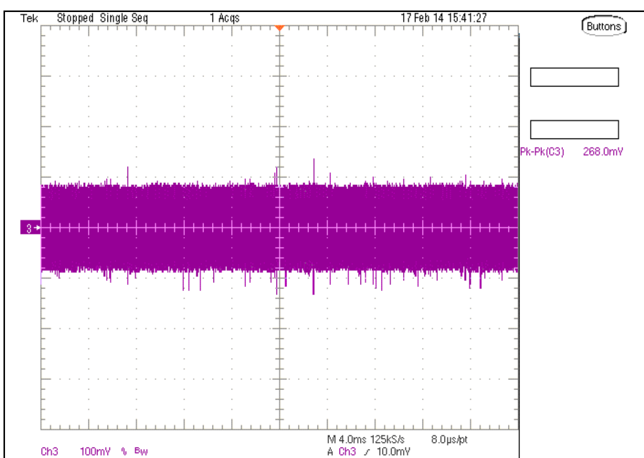


PSKILL PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High

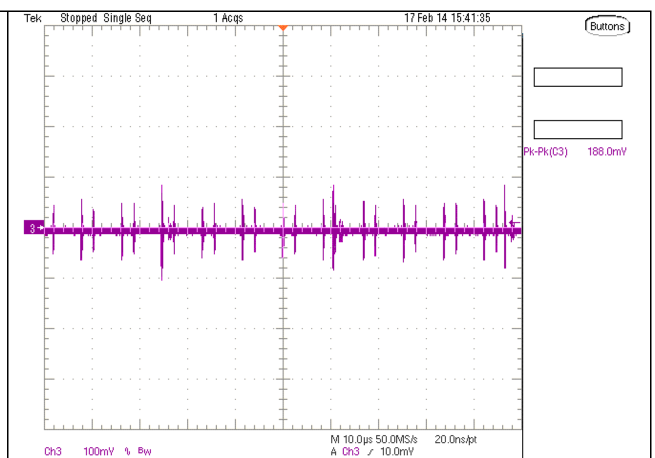


PSKILL PARD; I/P: 264Vac/63Hz,O/P: Max load (Standby Mode) BW: 20MHz.
CH3: PSKILL Vp-p High

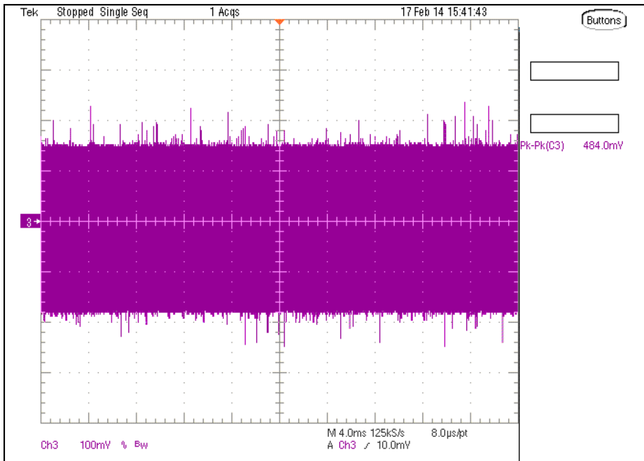
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.	*	268.0	PASS
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.	*	188.0	PASS
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.	*	484.0	PASS
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.	*	436.0	PASS
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.	*	268.0	PASS
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.	*	168.0	PASS
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.	*	476.0	PASS
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.	*	336.0	PASS
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.	*	248.0	PASS
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.	*	196.0	PASS
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.	*	504.0	PASS
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.	*	388.0	PASS
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.	*	252.0	PASS
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.	*	164.0	PASS
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.	*	520.0	PASS
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.	*	372.0	PASS



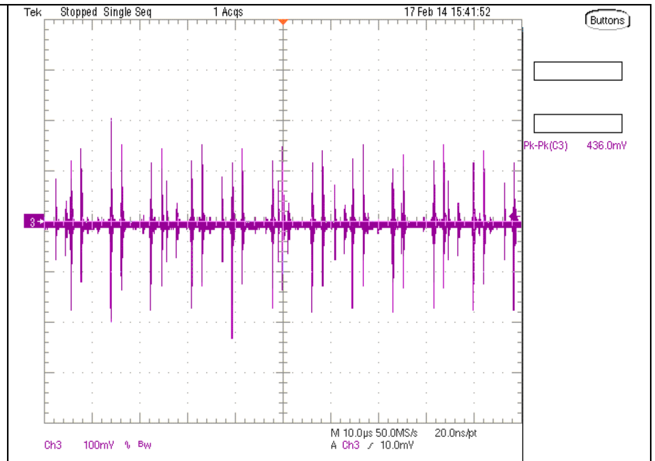
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.
CH3: PSKILL Vp-p to Low



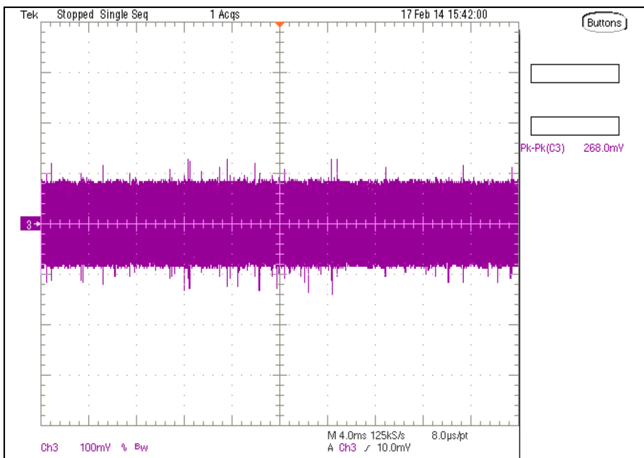
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.
CH3: PSKILL Vp-p to Low



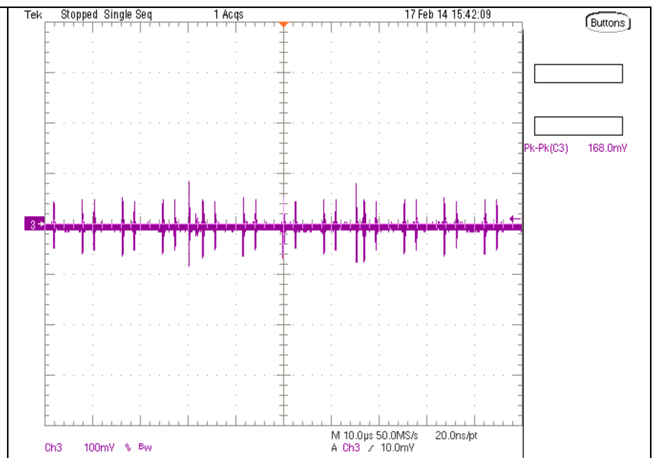
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.
CH3: PSKILL Vp-p to Low



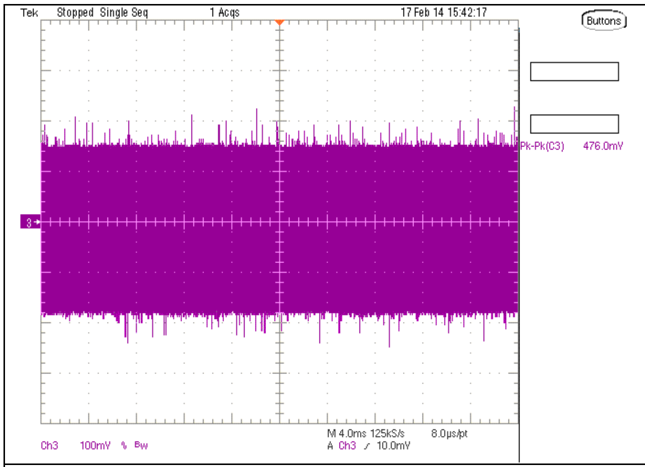
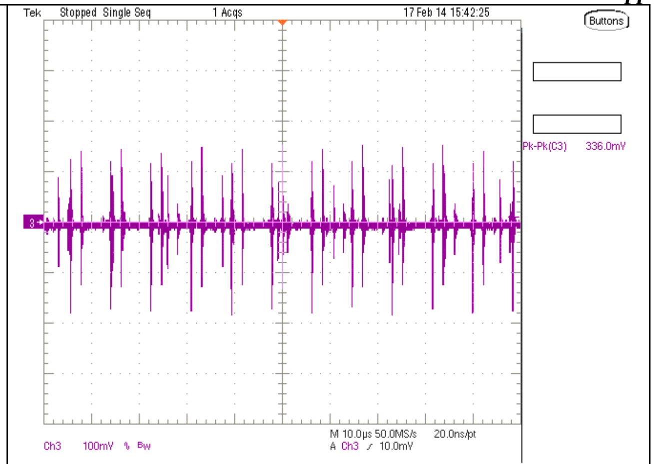
PSKILL PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.
CH3: PSKILL Vp-p to Low

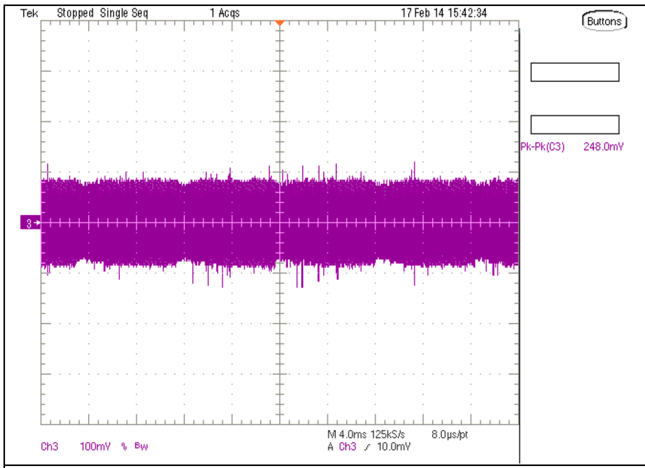
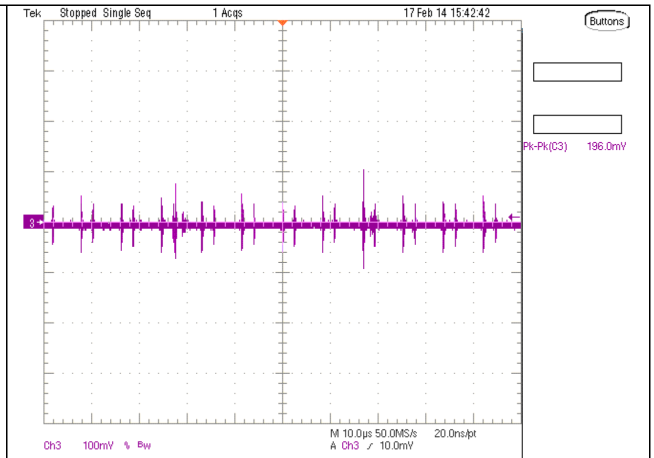


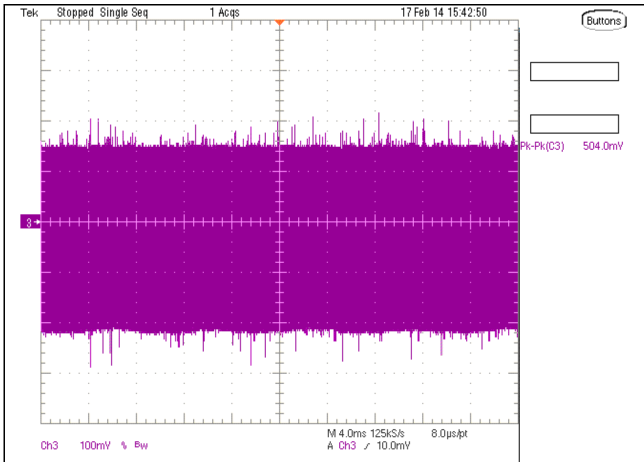
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.
CH3: PSKILL Vp-p to Low



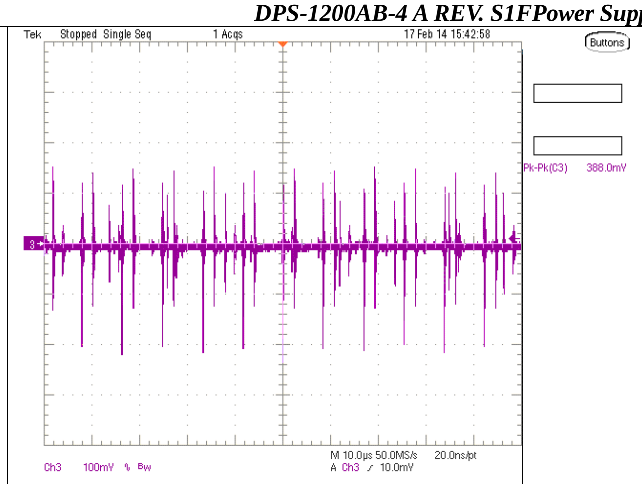
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.
CH3: PSKILL Vp-p to Low

	
PSKILL PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz. CH3: PSKILL Vp-p to Low	PSKILL PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz. CH3: PSKILL Vp-p to Low

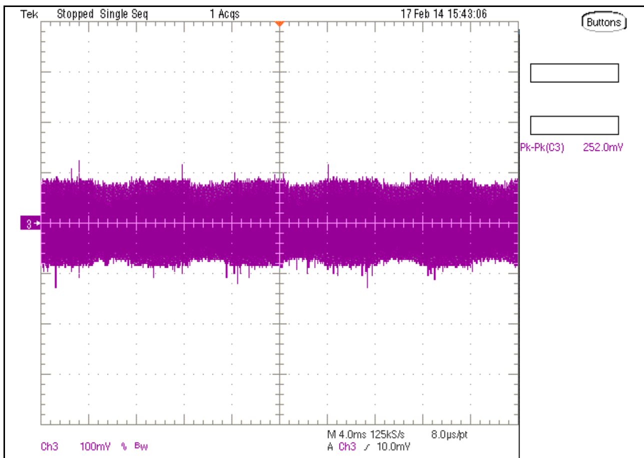
	
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz. CH3: PSKILL Vp-p to Low	PSKILL PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz. CH3: PSKILL Vp-p to Low



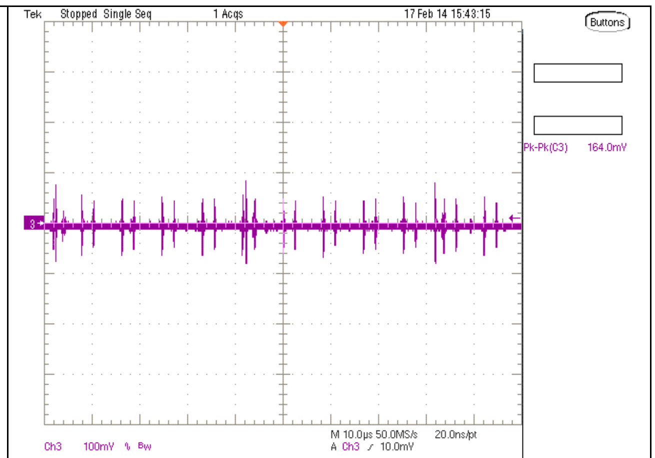
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.
CH3: PSKILL Vp-p to Low



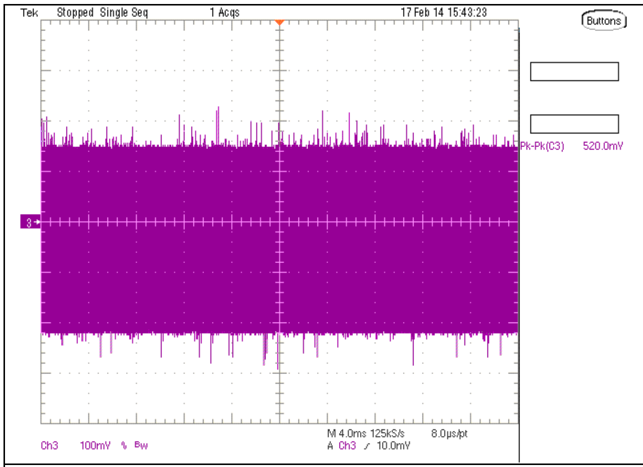
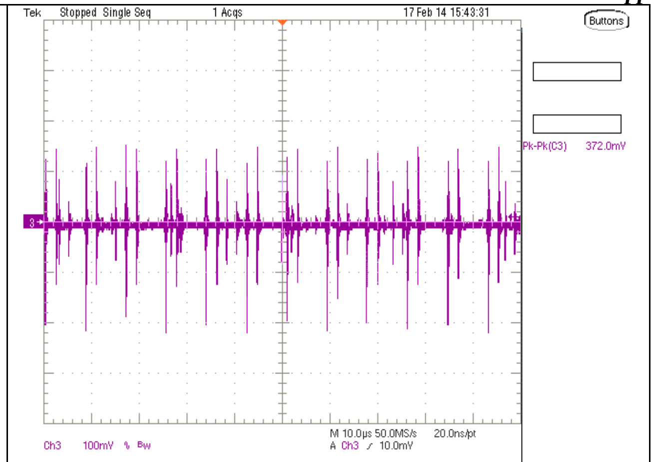
PSKILL PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.
CH3: PSKILL Vp-p to Low



PSKILL PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.
CH3: PSKILL Vp-p to Low



PSKILL PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.
CH3: PSKILL Vp-p to Low

	
PSKILL PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz. CH3: PSKILL Vp-p to Low	PSKILL PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz. CH3: PSKILL Vp-p to Low

6.4 PWOK

PWOK is a power OK signal and will be pulled HIGH by the power supply to indicate that all the outputs are within the regulation limits of the power supply. When any output voltage falls below regulation limits or when AC power has been removed for a time sufficiently long so that power supply operation is no longer guaranteed, PWOK will be de-asserted to a LOW state. The start of the PWOK delay time shall inhibited as long as any power supply output is in current limit.

Table 16 PWOK Signal Characteristics

Signal Type	Open collector/drain output from power supply. Pull-up to VSB located in the power supply.	
PWOK = High	**Power OK**	
PWOK = Low	Power Not OK	
	MIN	**MAX**
Logic level low voltage, Isink=400uA	**0V**	**0.4V**
Logic level high voltage, Isource=200µA	~~**2.4V**~~ **2.0V**	~~3.45V~~ 3.46V
PWOK rise and fall time		**100µsec**

6.4 PWOK

Test conditions:

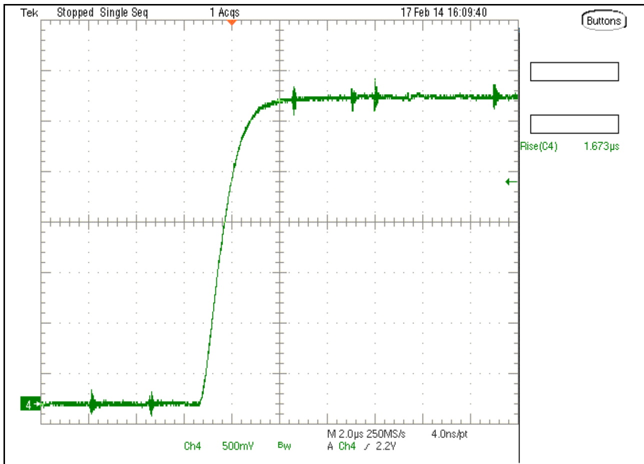
Sample NO.1

AMB. 25℃

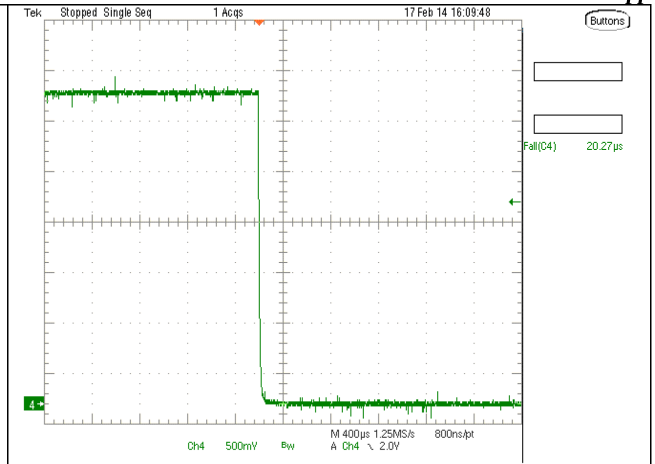
Graphical Result: PASS

Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
PWOK Rise Time; I/P: 90Vac/47Hz, O/P: Min Load	0.100	*	0.001673	PASS
PWOK Rise Time; I/P: 90Vac/47Hz, O/P: Max Load	0.100	*	0.001581	PASS
PWOK Rise Time; I/P: 100Vac/60Hz, O/P: Min Load	0.100	*	0.001682	PASS
PWOK Rise Time; I/P: 100Vac/60Hz, O/P: Max Load	0.100	*	0.001684	PASS
PWOK Rise Time; I/P: 200Vac/60Hz, O/P: Min Load	0.100	*	0.001680	PASS
PWOK Rise Time; I/P: 200Vac/60Hz, O/P: Max Load	0.100	*	0.001682	PASS
PWOK Rise Time; I/P: 264Vac/63Hz, O/P: Min Load	0.100	*	0.001649	PASS
PWOK Rise Time; I/P: 264Vac/63Hz, O/P: Max Load	0.100	*	0.001639	PASS

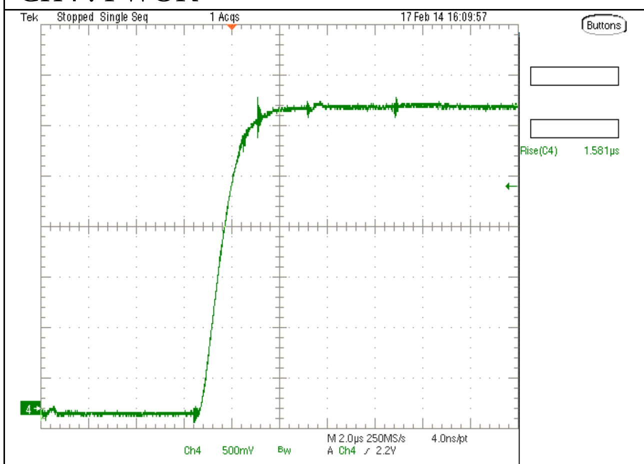
Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
PWOK Fall Time; I/P: 90Vac/47Hz, O/P: Min Load	0.100	*	0.020269	PASS
PWOK Fall Time; I/P: 90Vac/47Hz, O/P: Max Load	0.100	*	0.020823	PASS
PWOK Fall Time; I/P: 100Vac/60Hz, O/P: Min Load	0.100	*	0.021030	PASS
PWOK Fall Time; I/P: 100Vac/60Hz, O/P: Max Load	0.100	*	0.020408	PASS
PWOK Fall Time; I/P: 200Vac/60Hz, O/P: Min Load	0.100	*	0.020817	PASS
PWOK Fall Time; I/P: 200Vac/60Hz, O/P: Max Load	0.100	*	0.020189	PASS
PWOK Fall Time; I/P: 264Vac/63Hz, O/P: Min Load	0.100	*	0.020246	PASS
PWOK Fall Time; I/P: 264Vac/63Hz, O/P: Max Load	0.100	*	0.021039	PASS



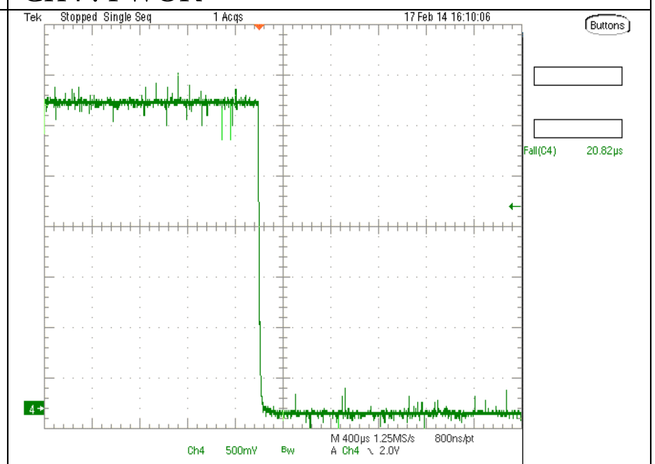
PWOK Rise Time; I/P: 90Vac/47Hz, O/P: Min Load
CH4 : PWOK



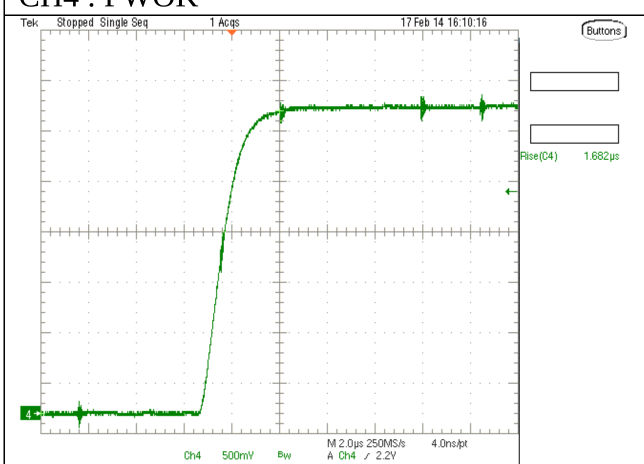
PWOK Fall Time; I/P: 90Vac/47Hz, O/P: Min Load
CH4 : PWOK



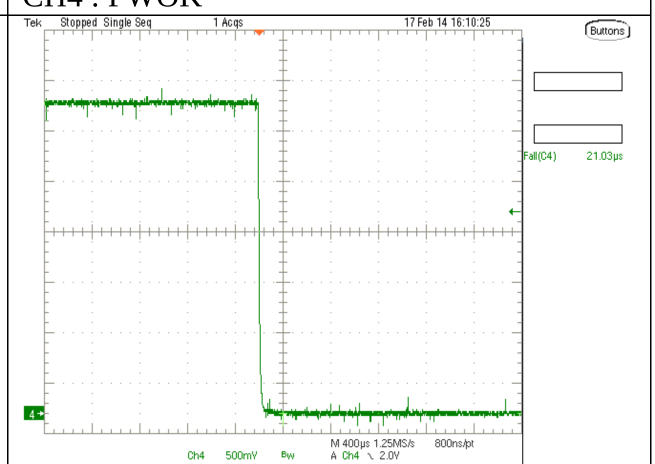
PWOK Rise Time; I/P: 90Vac/47Hz, O/P: Max Load
CH4 : PWOK



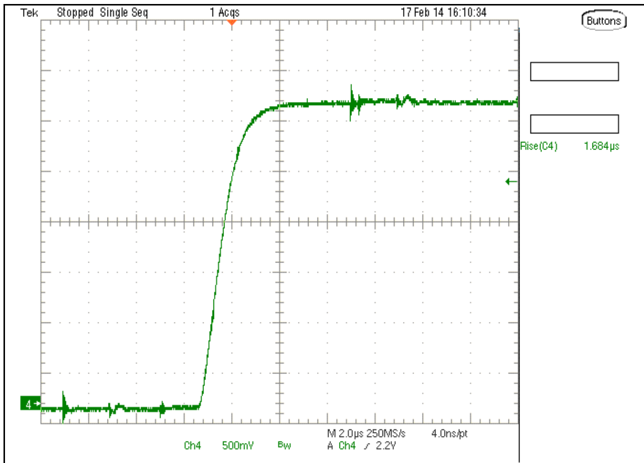
PWOK Fall Time; I/P: 90Vac/47Hz, O/P: Max Load
CH4 : PWOK



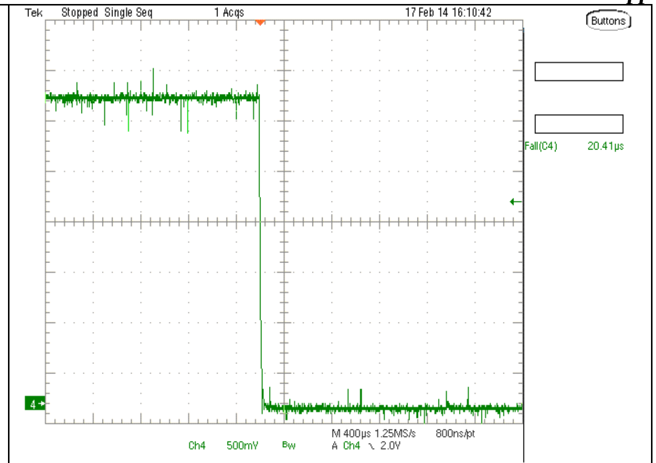
PWOK Rise Time; I/P: 100Vac/60Hz, O/P: Min Load
CH4 : PWOK



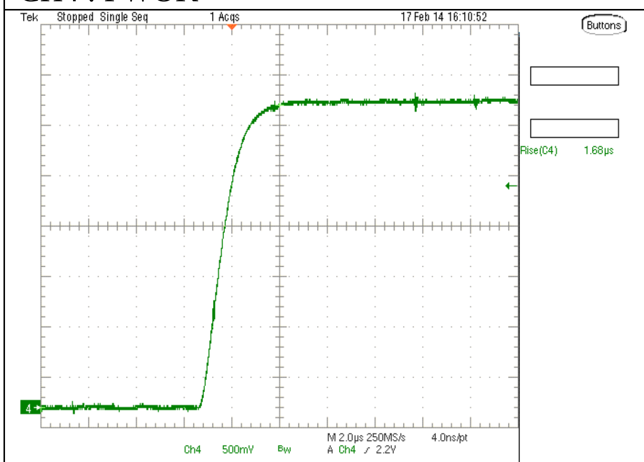
PWOK Fall Time; I/P: 100Vac/60Hz, O/P: Min Load
CH4 : PWOK



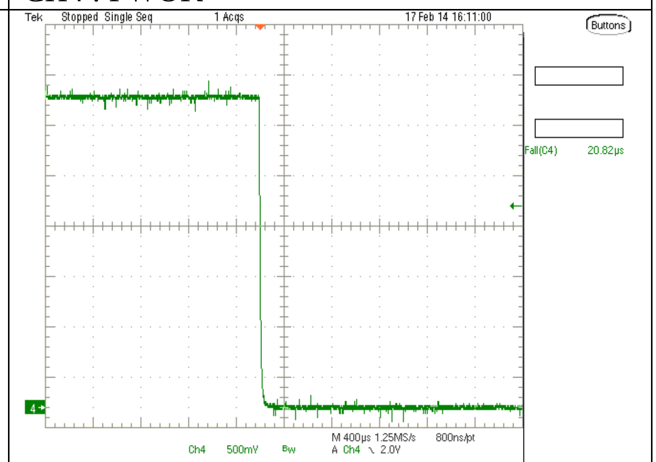
PWOK Rise Time; I/P: 100Vac/60Hz, O/P: Max Load
CH4 : PWOK



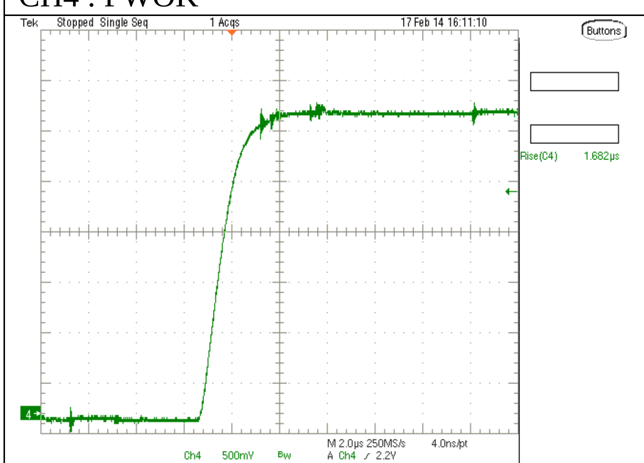
PWOK Fall Time; I/P: 100Vac/60Hz, O/P: Max Load
CH4 : PWOK



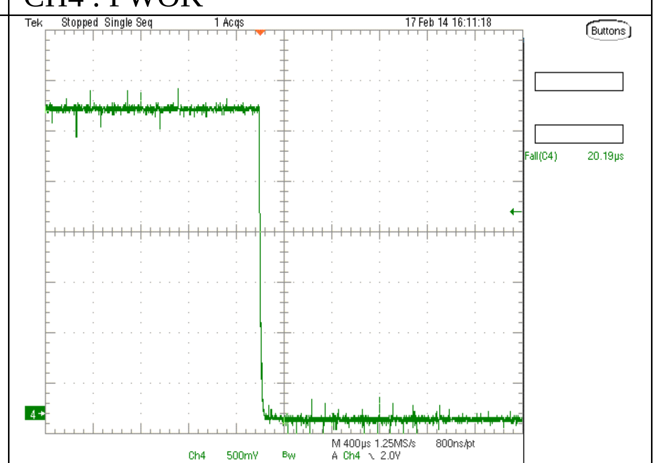
PWOK Rise Time; I/P: 200Vac/60Hz, O/P: Min Load
CH4 : PWOK



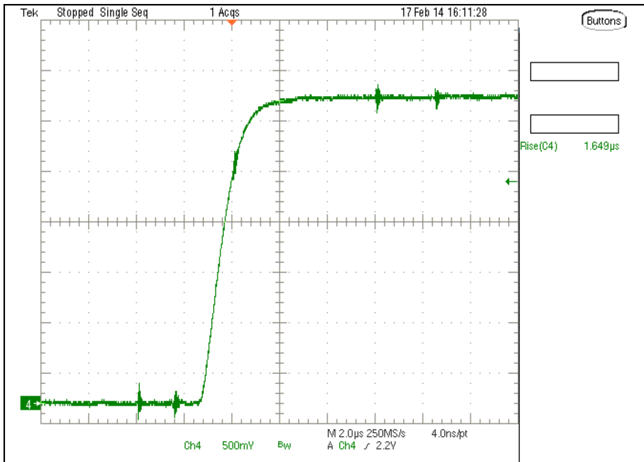
PWOK Fall Time; I/P: 200Vac/60Hz, O/P: Min Load
CH4 : PWOK



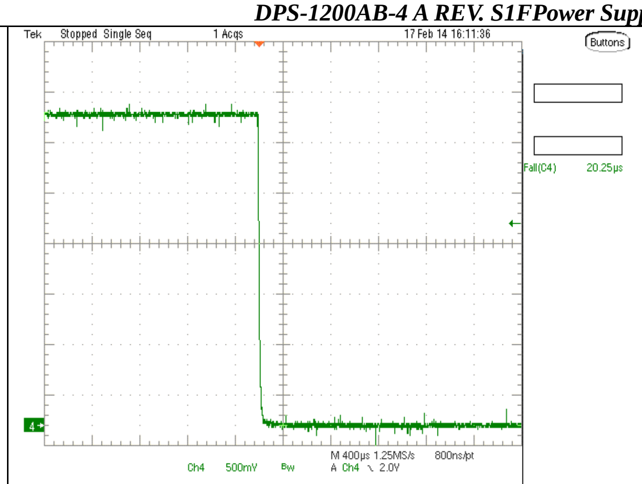
PWOK Rise Time; I/P: 200Vac/60Hz, O/P: Max Load
CH4 : PWOK



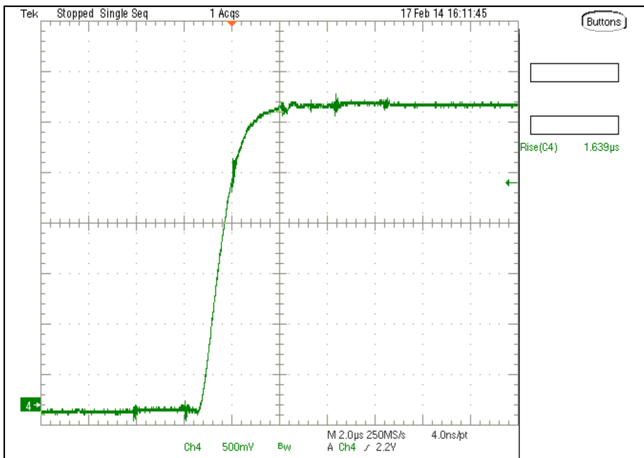
PWOK Fall Time; I/P: 200Vac/60Hz, O/P: Max Load
CH4 : PWOK



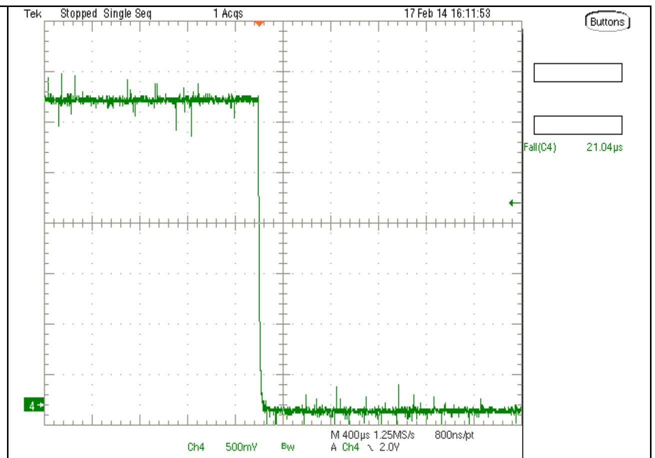
PWOK Rise Time; I/P: 264Vac/63Hz, O/P: Min Load
CH4 : PWOK



PWOK Fall Time; I/P: 264Vac/63Hz, O/P: Min Load
CH4 : PWOK



PWOK Rise Time; I/P: 264Vac/63Hz, O/P: Max Load
CH4 : PWOK



PWOK Fall Time; I/P: 264Vac/63Hz, O/P: Max Load
CH4 : PWOK

6.3 PWOK

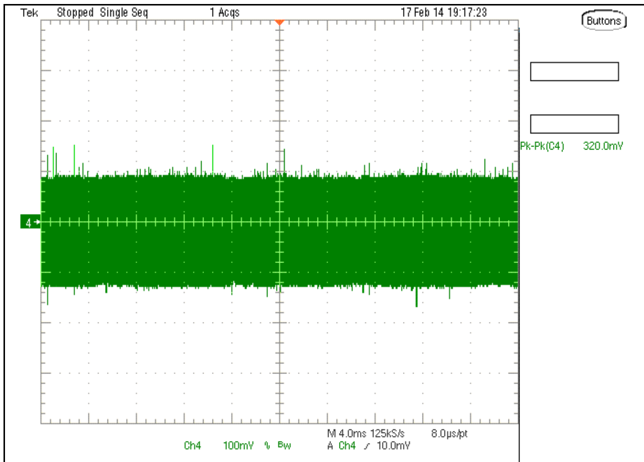
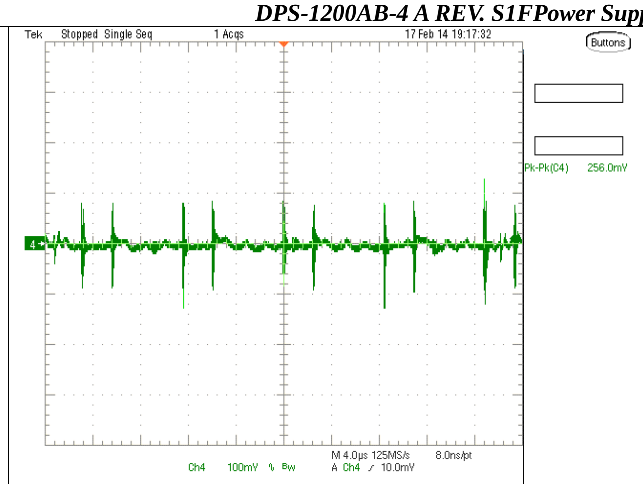
Test conditions:

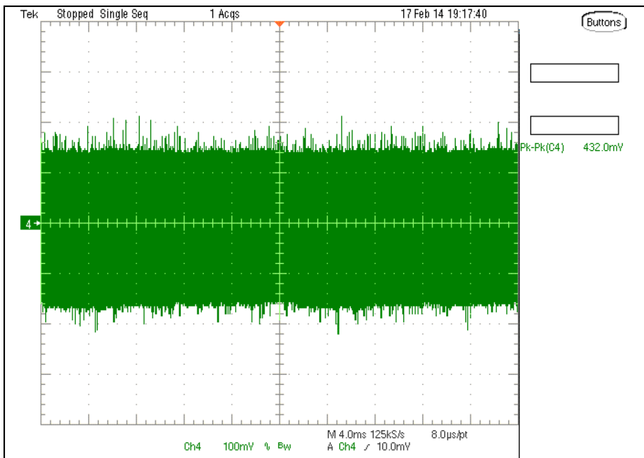
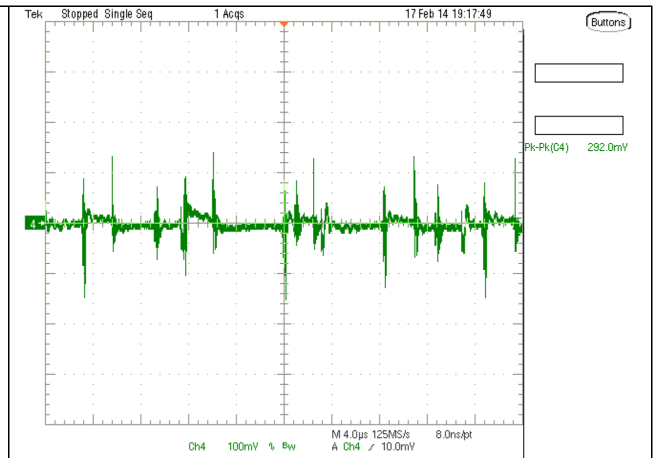
Sample NO.1

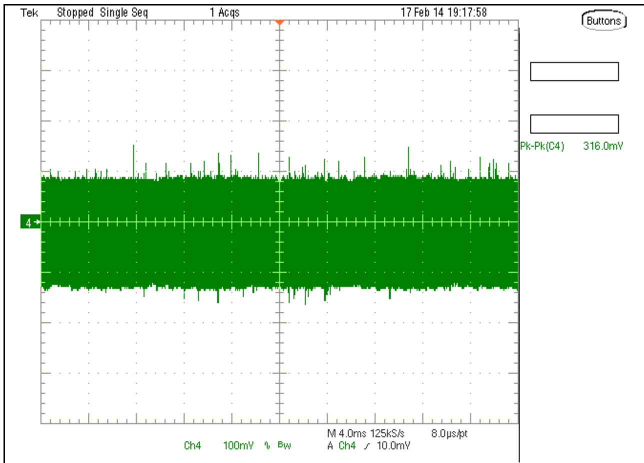
AMB. 25℃

Graphical Result: PASS

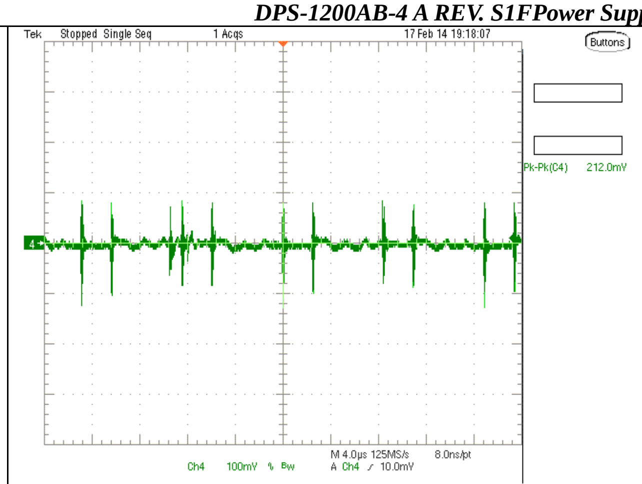
Test Condition	PARD Limit (mV)	PARD Reading (mVp-p)	Result
PSOK PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.	*	320.00	PASS
PSOK PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.	*	256.00	PASS
PSOK PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.	*	432.00	PASS
PSOK PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.	*	292.00	PASS
PSOK PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.	*	316.00	PASS
PSOK PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.	*	212.00	PASS
PSOK PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.	*	408.00	PASS
PSOK PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.	*	256.00	PASS
PSOK PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.	*	316.00	PASS
PSOK PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.	*	216.00	PASS
PSOK PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.	*	428.00	PASS
PSOK PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.	*	296.00	PASS
PSOK PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.	*	316.00	PASS
PSOK PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.	*	120.00	PASS
PSOK PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.	*	384.00	PASS
PSOK PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.	*	252.00	PASS

	
PSOK PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz. CH4: PSOK Vp-p	PSOK PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz. CH4: PSOK Vp-p

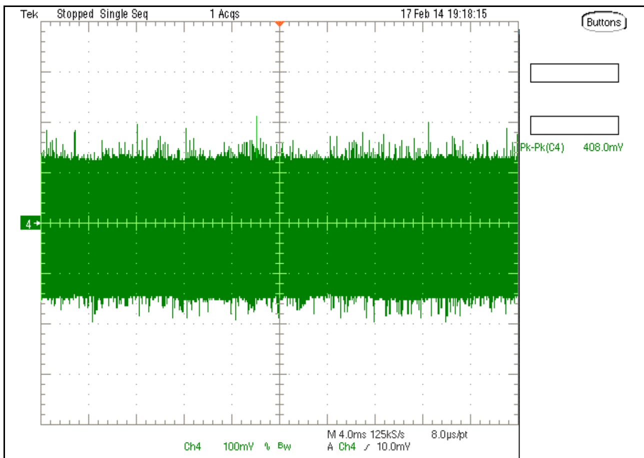
	
PSOK PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz. CH4: PSOK Vp-p	PSOK PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz. CH4: PSOK Vp-p



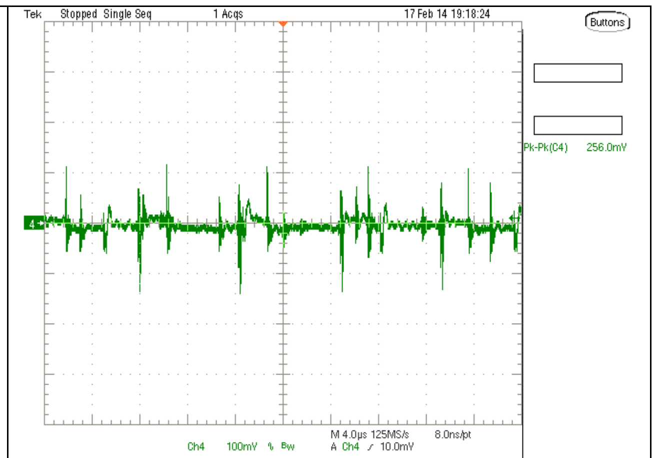
PSOK PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.
CH4: PSOK Vp-p



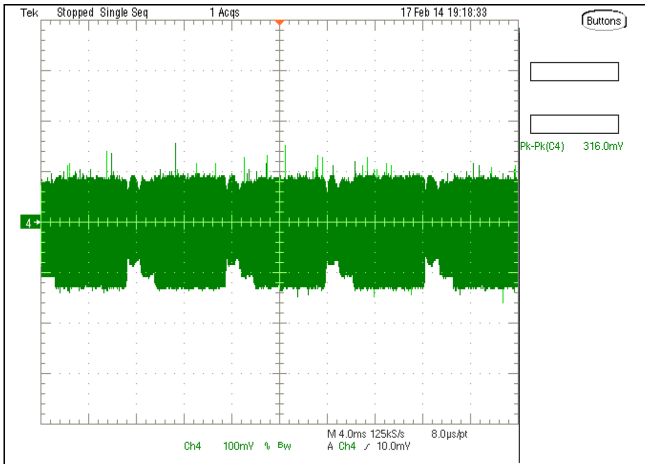
PSOK PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.
CH4: PSOK Vp-p



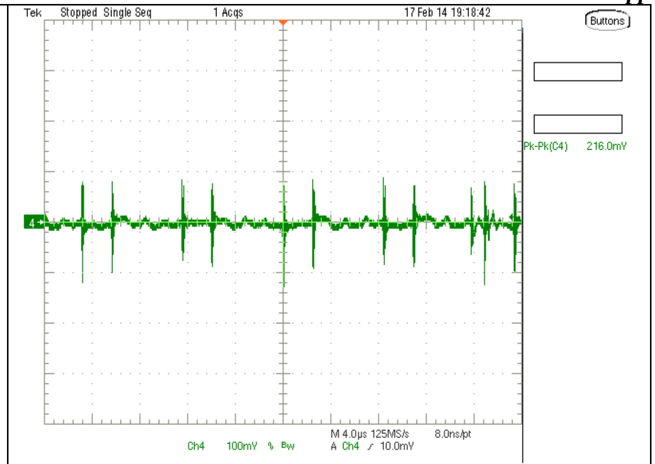
PSOK PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.
CH4: PSOK Vp-p



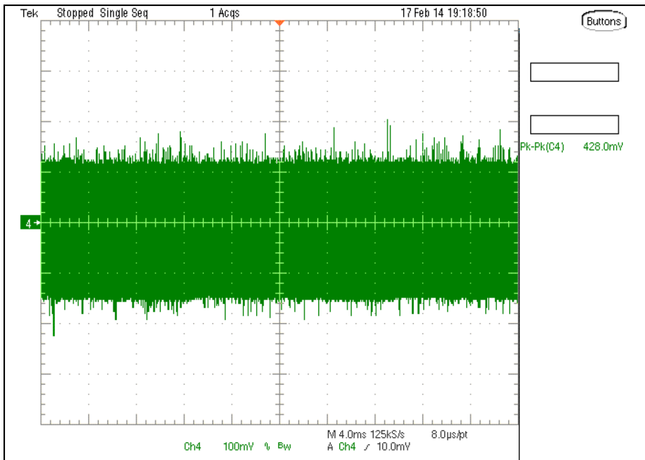
PSOK PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.
CH4: PSOK Vp-p



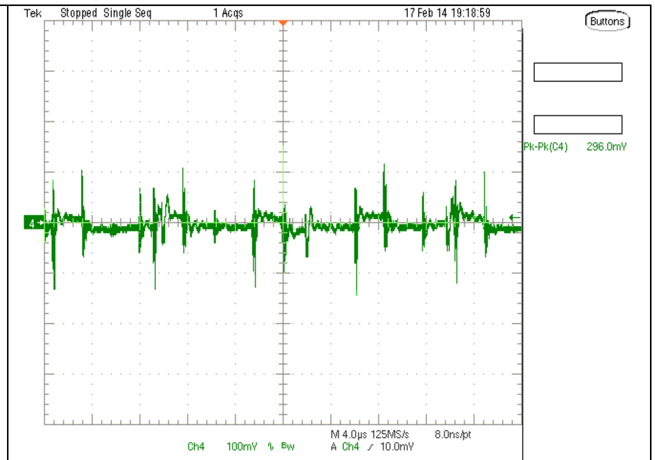
PSOK PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.
CH4: PSOK Vp-p



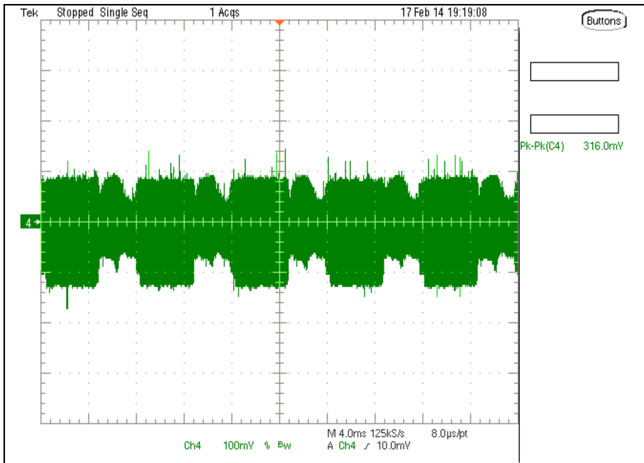
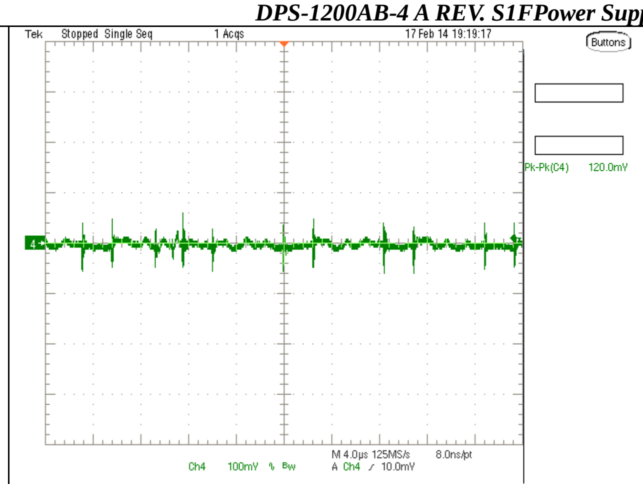
PSOK PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.
CH4: PSOK Vp-p

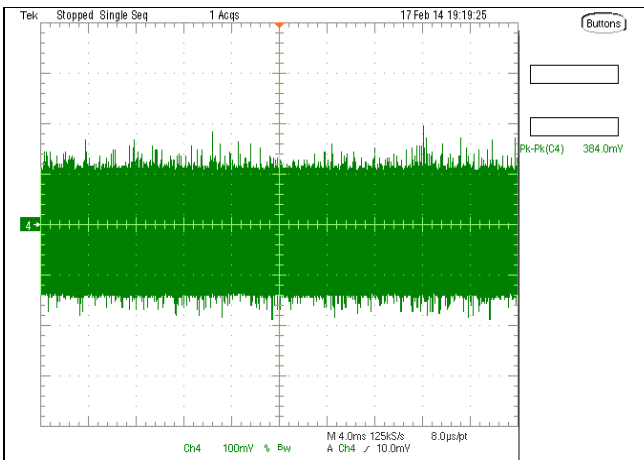
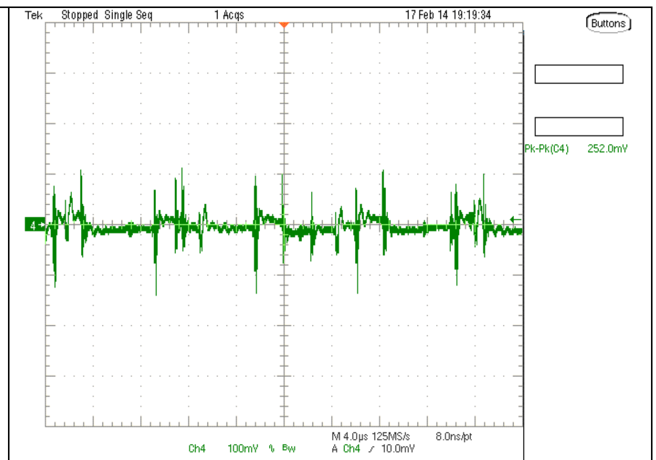


PSOK PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.
CH4: PSOK Vp-p



PSOK PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.
CH4: PSOK Vp-p

	
PSOK PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz. CH4: PSOK Vp-p	PSOK PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz. CH4: PSOK Vp-p

	
PSOK PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz. CH4: PSOK Vp-p	PSOK PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz. CH4: PSOK Vp-p

6.5 PRESENT_N

This signal is connected to the PSU´s output ground.

Test condition:

Sample NO. 1+1

AMB. 25℃

INPUT: 264V/63Hz

Load: +12V/0A, +12Vsb/0A

Graphical Result: N/A

6.6 SMBAlert

This low active, sideband and open collector signal indicates that the PSU is experiencing a problem, warning or fault that the system agent should investigate. The signal can be reset by clearing the fault bits in the corresponding STATUS registers.

Signal type	Open Collector, pull up is located inside PSU	
SMBALERT = High	OK	
SMBALERT = Low	Alert to system	
	Min	**Max**
Logic level low voltage, $I_{sink} \leq 4mA$	0V	0.4V
Logic level high voltage, $I_{source} = 50uA$	2V	~~3.45V~~ 3.46V
SMBALERT rise and fall time		100us

Table18: SMBALERT

By default the SMBAlert signal is asserted for the following cases.

1. AC input voltage drops below the fault threshold Vin < 75V +4/-5V) of the power supply for > 200msec
2. AC input voltage is lower than warning threshold. (the slew rate of voltage drop should less than -1V/s)
3. Thermal sensor on a hot spot inside the power supply has exceeded its warning temperature.
4. 12VSB abnormal condition.
5. Output current is greater than warning threshold.

Table 21: Power Supply SMBAlert Timing Requirements

Item	Description	PMBus command	MIN	MAX
T_{alert_ac}	Timing from input voltage dropping to 0VAC to SMBAlert going low	STATUS_INPUT UV Warning		4 msec
T_{over_temp}	Hot spot temp > warning threshold(>95degC)	STATUS_TEMPERATURE Over temp warning		1 second
$T_{over\_current}$	Iout over current > warning	STATUS_IOUT Iout OC warning		10~15msec

The SMBAlert signal shall be cleared and re-armed by the following methods.

- Clearing STATUS bits causing the asserted SMBAlert signal.
- Power cycling with PSON or with AC power. (12V turns off then on again)
- 12VSB escapes from protection event and recovers to normal state.

6.6 SMBAlert

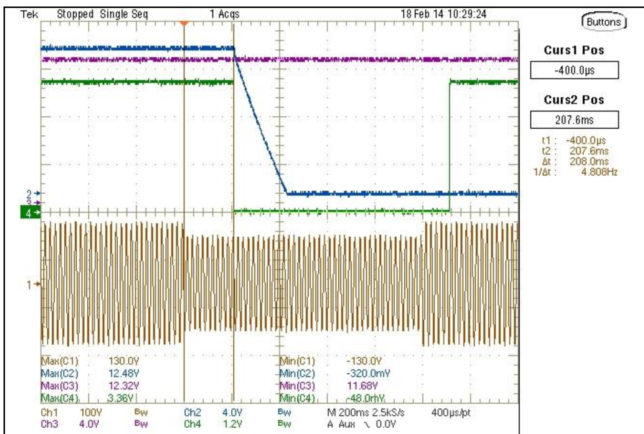
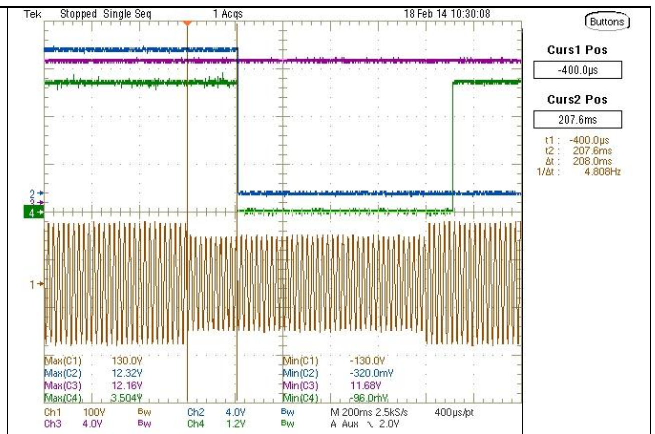
Test conditions:

Sample NO.1

AMB. 25℃

Graphical Result: PASS

Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
SMBAlert dropout; I/P: 90Vac to 70Vac O/P:Min Load	*	200.00	208.00	PASS
SMBAlert dropout; I/P: 90Vac to 70Vac O/P:Max Load	*	200.00	208.00	PASS

	
SMBAlert dropout; I/P: 90Vac to 70Vac O/P:Min Load (1) AC I/P (2) 12V (3) 12Vsb (4) SMBAlert	SMBAlert dropout; I/P: 90Vac to 70Vac O/P:Max Load (1) AC I/P (2) 12V (3) 12Vsb (4) SMBAlert

6.6 SMBAlert

Test conditions:

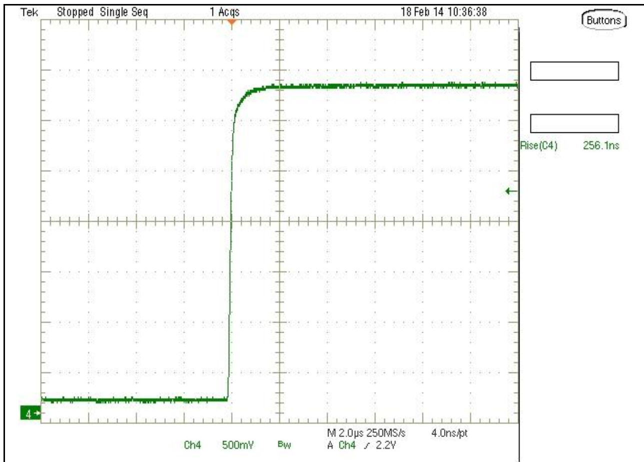
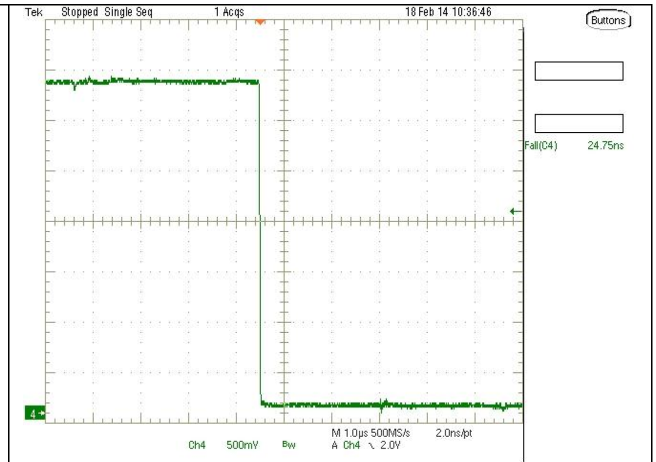
Sample NO.1

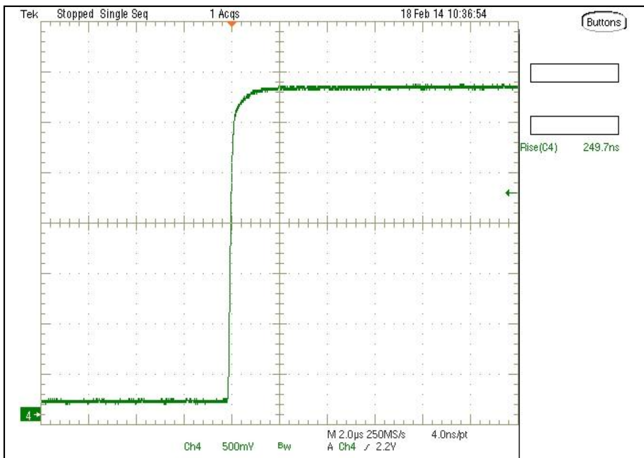
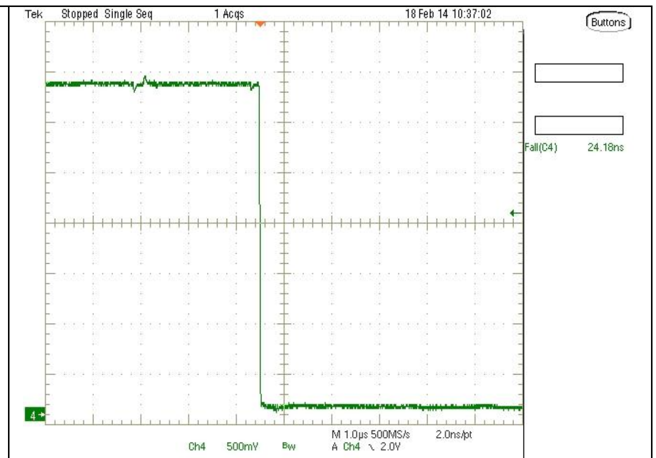
AMB. 25℃

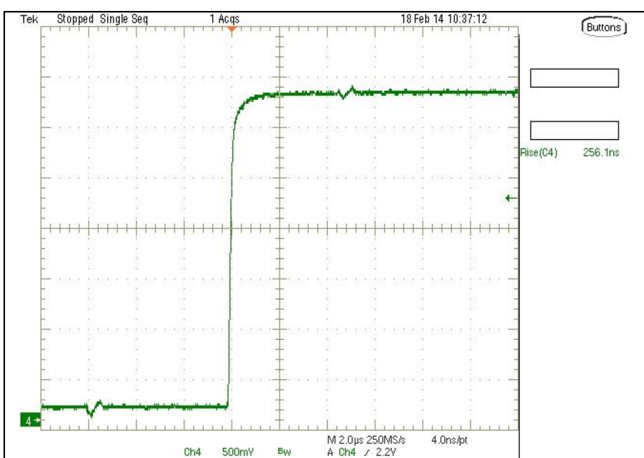
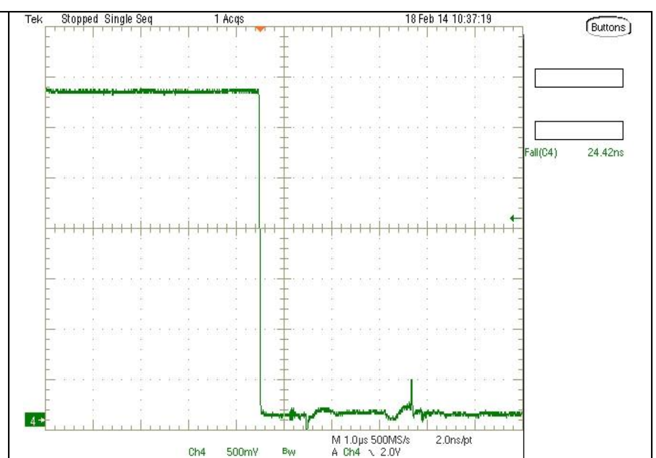
Graphical Result: PASS

Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
SMBAlert Rise Time; I/P: 90Vac/47Hz, O/P: Min Load	0.100	*	0.000256	PASS
SMBAlert Rise Time; I/P: 90Vac/47Hz, O/P: Min Load	0.100	*	0.000250	PASS
SMBAlert Rise Time; I/P: 90Vac/47Hz, O/P: Max Load	0.100	*	0.000256	PASS
SMBAlert Rise Time; I/P: 100Vac/60Hz, O/P: Min Load	0.100	*	0.000253	PASS
SMBAlert Rise Time; I/P: 100Vac/60Hz, O/P: Max Load	0.100	*	0.000264	PASS
SMBAlert Rise Time; I/P: 200Vac/60Hz, O/P: Min Load	0.100	*	0.000251	PASS
SMBAlert Rise Time; I/P: 200Vac/60Hz, O/P: Max Load	0.100	*	0.000248	PASS
SMBAlert Rise Time; I/P: 264Vac/63Hz, O/P: Min Load	0.100	*	0.000257	PASS
SMBAlert Rise Time; I/P: 264Vac/63Hz, O/P: Max Load	0.100	*	0.000262	PASS

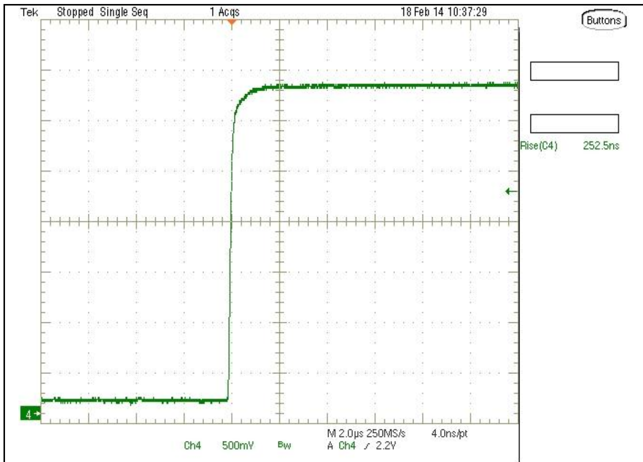
Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
SMBAlert Fall Time; I/P: 90Vac/47Hz, O/P: Min Load	0.100	*	0.000025	PASS
SMBAlert Fall Time; I/P: 90Vac/47Hz, O/P: Min Load	0.100	*	0.000024	PASS
SMBAlert Fall Time; I/P: 90Vac/47Hz, O/P: Max Load	0.100	*	0.000024	PASS
SMBAlert Fall Time; I/P: 100Vac/60Hz, O/P: Min Load	0.100	*	0.000025	PASS
SMBAlert Fall Time; I/P: 100Vac/60Hz, O/P: Max Load	0.100	*	0.000025	PASS
SMBAlert Fall Time; I/P: 200Vac/60Hz, O/P: Min Load	0.100	*	0.000025	PASS
SMBAlert Fall Time; I/P: 200Vac/60Hz, O/P: Max Load	0.100	*	0.000025	PASS
SMBAlert Fall Time; I/P: 264Vac/63Hz, O/P: Min Load	0.100	*	0.000024	PASS
SMBAlert Fall Time; I/P: 264Vac/63Hz, O/P: Max Load	0.100	*	0.000025	PASS

	
SMBAlert Rise Time; I/P: 90Vac/47Hz, O/P: Min Load CH4: SMB ALERT	SMBAlert Fall Time; I/P: 90Vac/47Hz, O/P: Min Load CH4: SMB ALERT

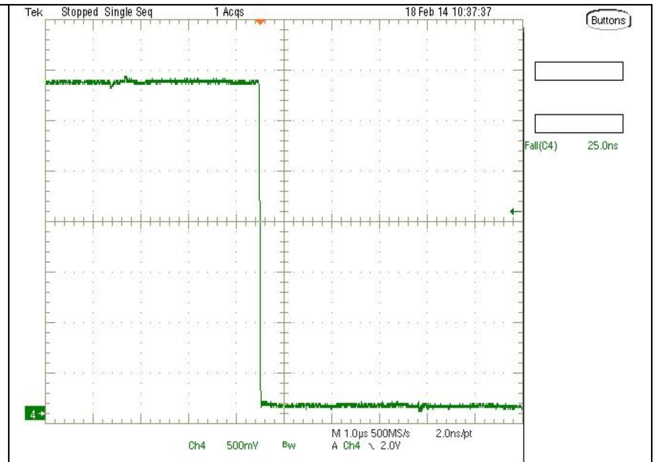
	
SMBAlert Rise Time; I/P: 90Vac/47Hz, O/P: Min Load CH4: SMB ALERT	SMBAlert Fall Time; I/P: 90Vac/47Hz, O/P: Min Load CH4: SMB ALERT

	
SMBAlert Rise Time; I/P: 90Vac/47Hz, O/P:	SMBAlert Fall Time; I/P: 90Vac/47Hz, O/P:

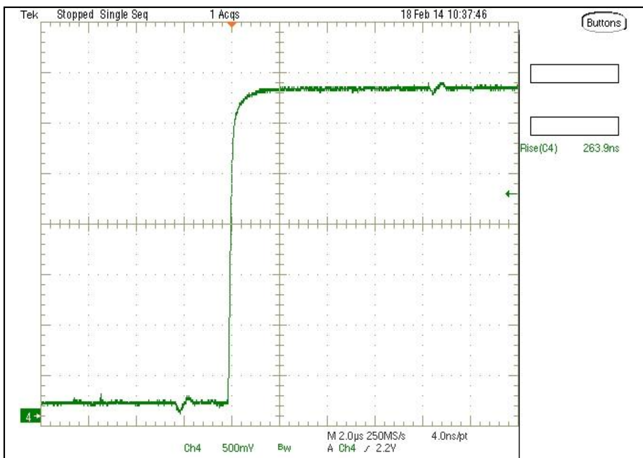
Max Load CH4: SMB ALERT	Max Load CH4: SMB ALERT



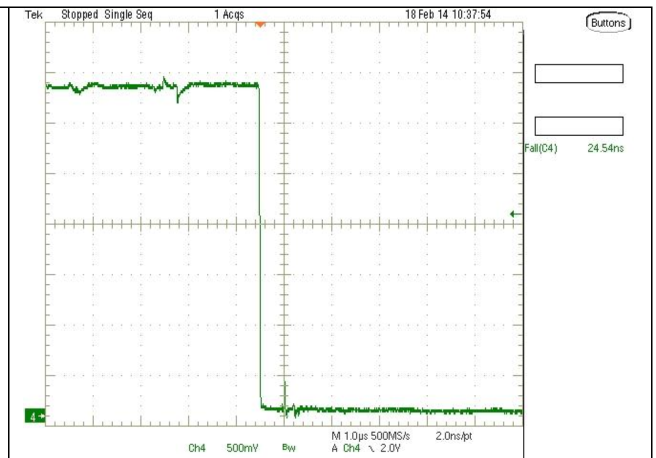
SMBAlert Rise Time; I/P: 100Vac/60Hz, O/P: Min Load
CH4: SMB ALERT



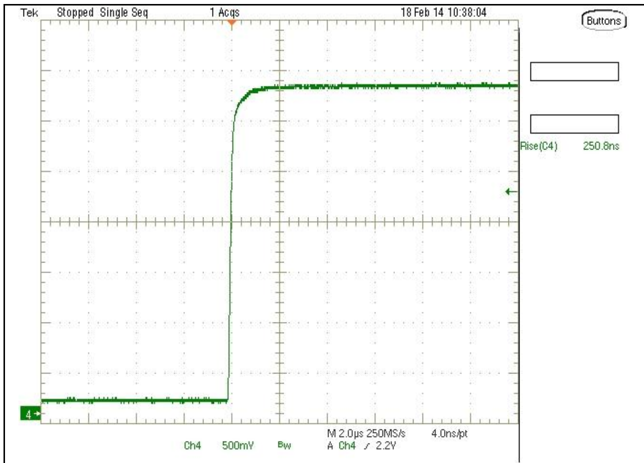
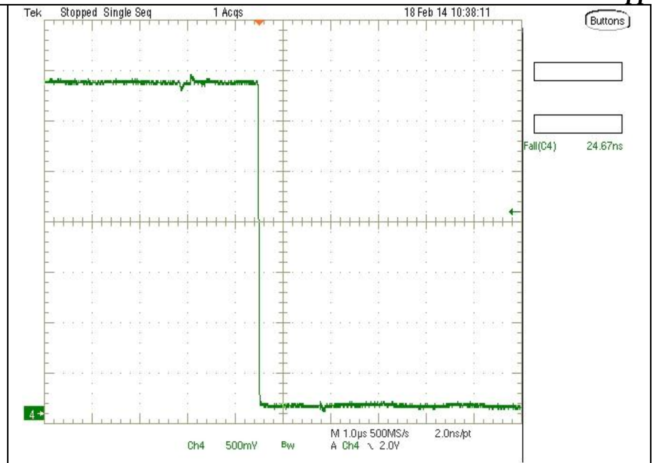
SMBAlert Fall Time; I/P: 100Vac/60Hz, O/P: Min Load
CH4: SMB ALERT

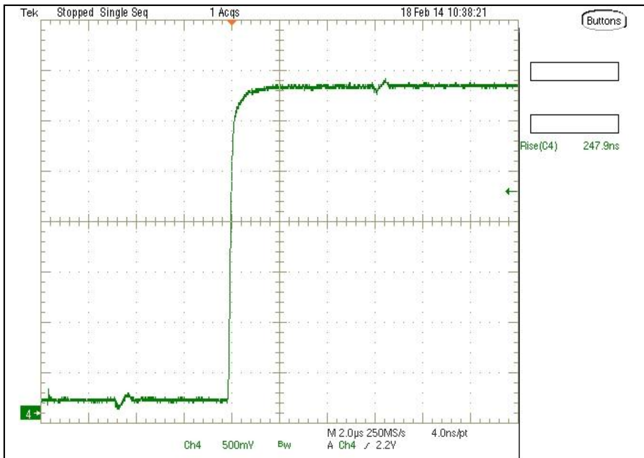
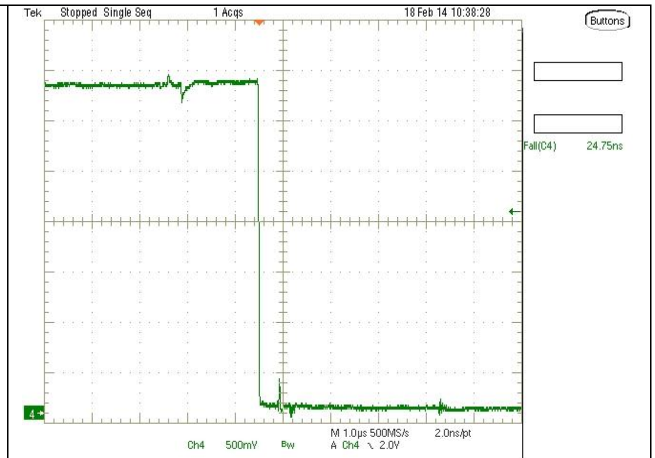


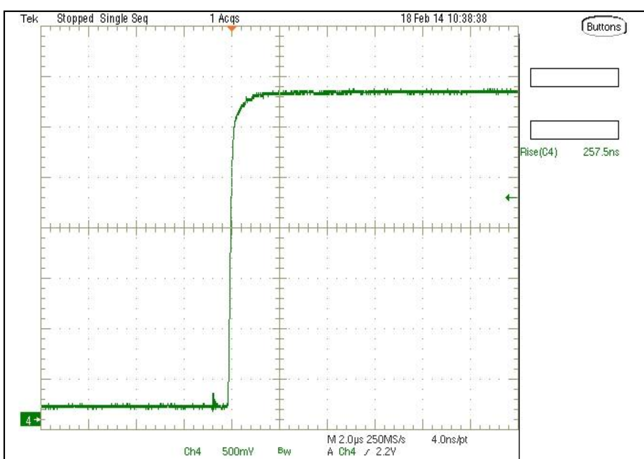
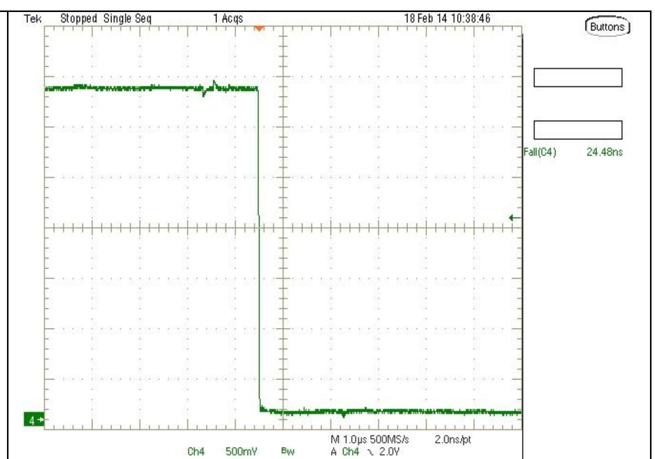
SMBAlert Rise Time; I/P: 100Vac/60Hz, O/P: Max Load
CH4: SMB ALERT

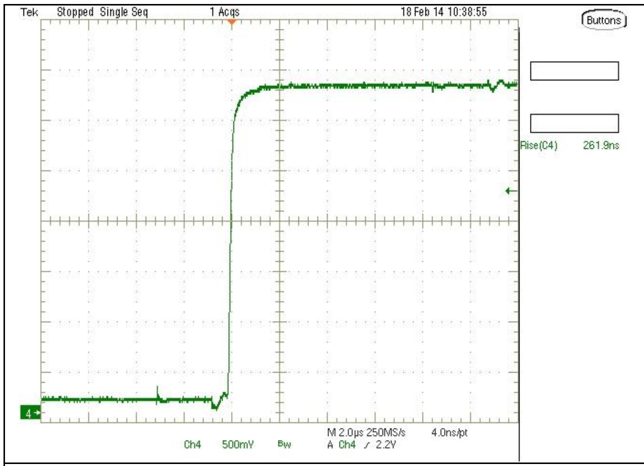
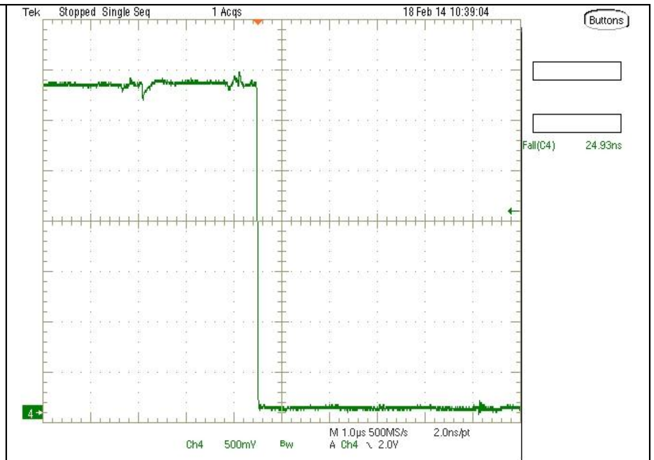


SMBAlert Fall Time; I/P: 100Vac/60Hz, O/P: Max Load
CH4: SMB ALERT

	
SMBAlert Rise Time; I/P: 200Vac/60Hz, O/P: Min Load CH4: SMB ALERT	SMBAlert Fall Time; I/P: 200Vac/60Hz, O/P: Min Load CH4: SMB ALERT

	
SMBAlert Rise Time; I/P: 200Vac/60Hz, O/P: Max Load CH4: SMB ALERT	SMBAlert Fall Time; I/P: 200Vac/60Hz, O/P: Max Load CH4: SMB ALERT

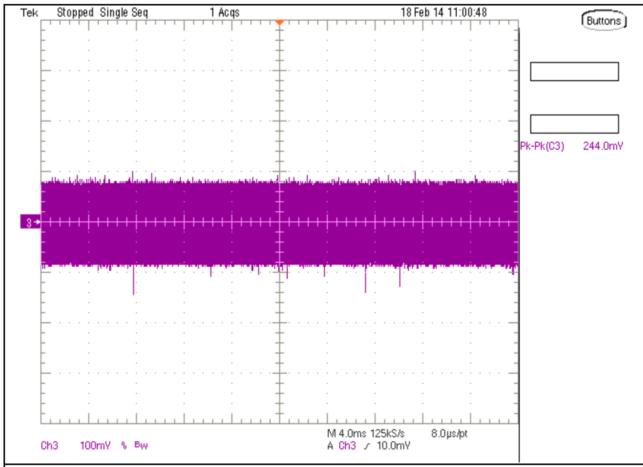
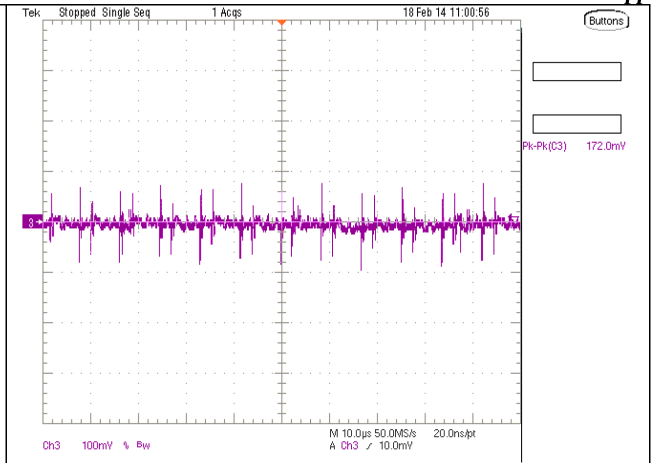
	
SMBAlert Rise Time; I/P: 264Vac/63Hz, O/P: Min Load	SMBAlert Fall Time; I/P: 264Vac/63Hz, O/P: Min Load

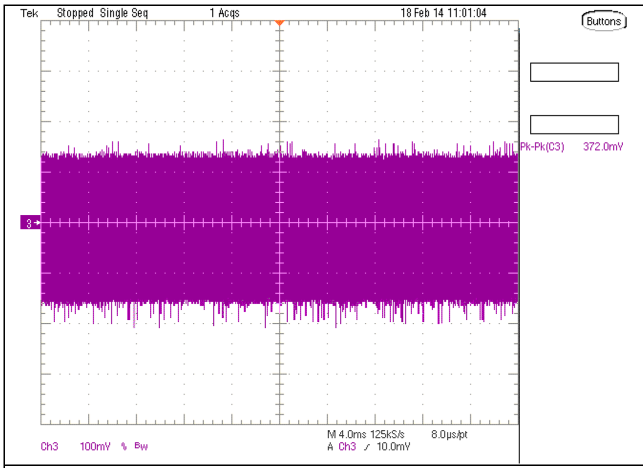
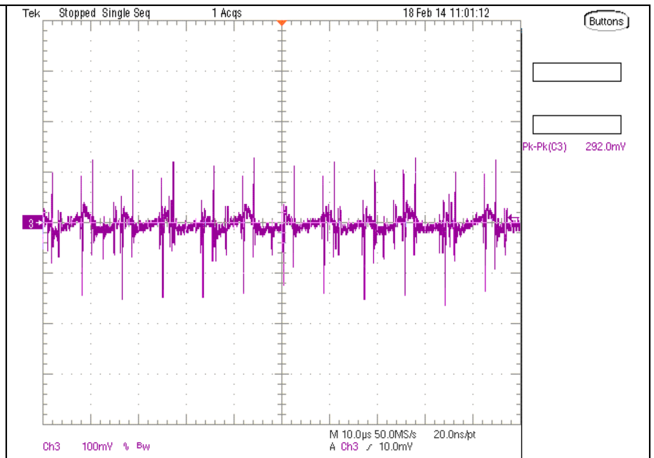
CH4: SMB ALERT	CH4: SMB ALERT
	
SMBAlert Rise Time; I/P: 264Vac/63Hz, O/P: Max Load CH4: SMB ALERT	SMBAlert Fall Time; I/P: 264Vac/63Hz, O/P: Max Load CH4: SMB ALERT

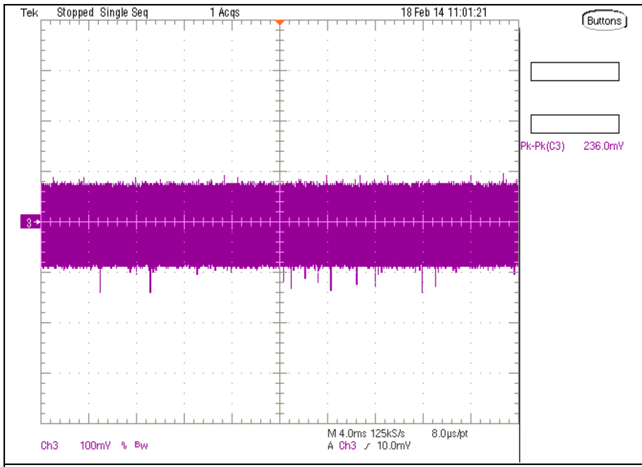
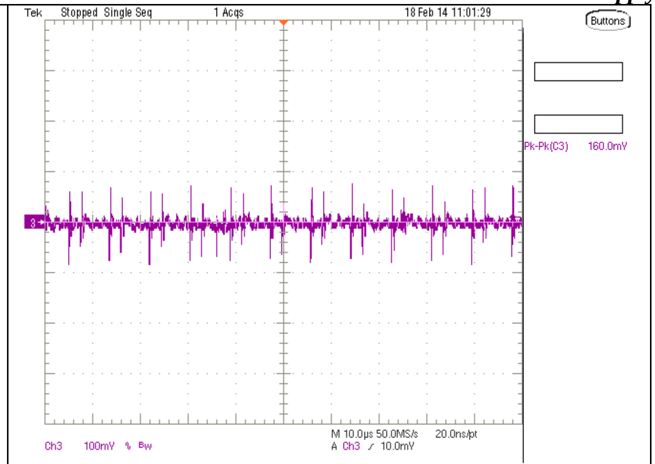
6.6 SMBAlert

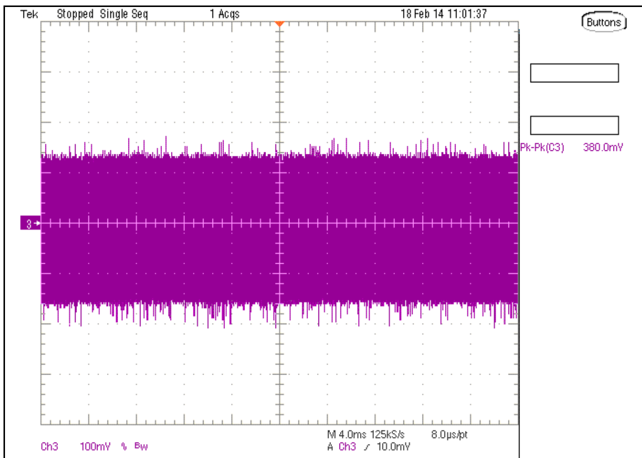
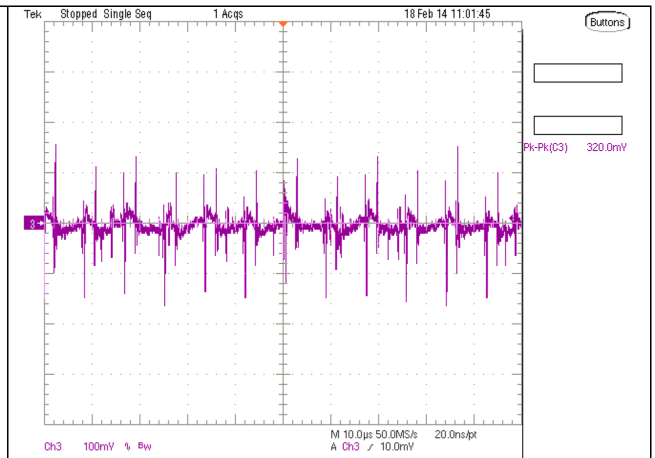
Test conditions:
Sample NO.1
AMB. 25℃
Graphical Result: PASS

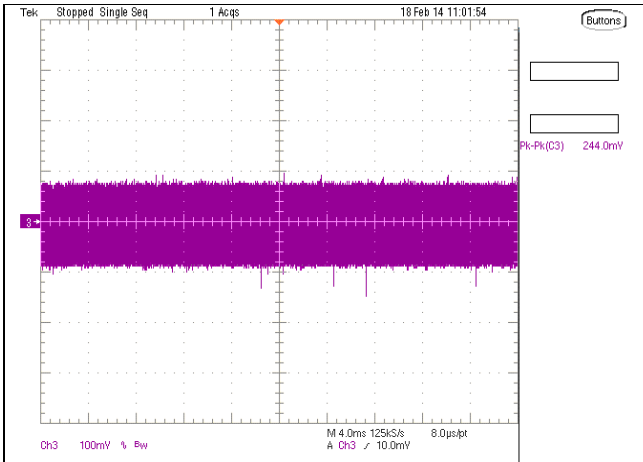
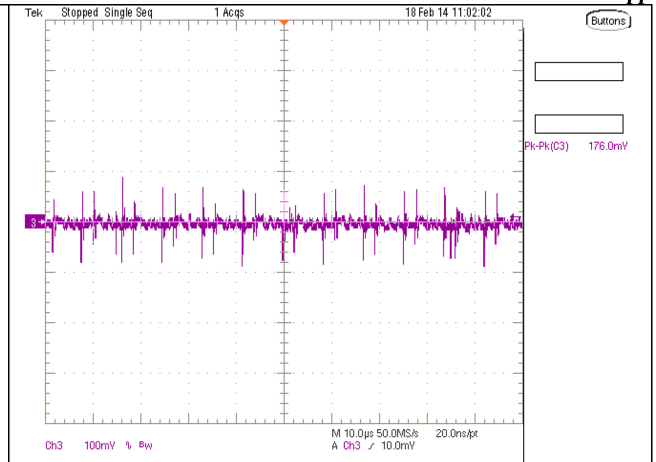
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
SMB Alert PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.	*	244.0	PASS
SMB Alert L PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.	*	172.0	PASS
SMB Alert PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.	*	372.0	PASS
SMB Alert PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.	*	292.0	PASS
SMB Alert PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.	*	236.0	PASS
SMB Alert PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.	*	160.0	PASS
SMB Alert PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.	*	380.0	PASS
SMB Alert PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.	*	320.0	PASS
SMB Alert PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.	*	244.0	PASS
SMB Alert PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.	*	176.0	PASS
SMB Alert PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.	*	388.0	PASS
SMB Alert PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.	*	292.0	PASS
SMB Alert PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.	*	228.0	PASS
SMB Alert PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.	*	164.0	PASS
SMB Alert PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.	*	376.0	PASS
SMB Alert PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.	*	284.0	PASS

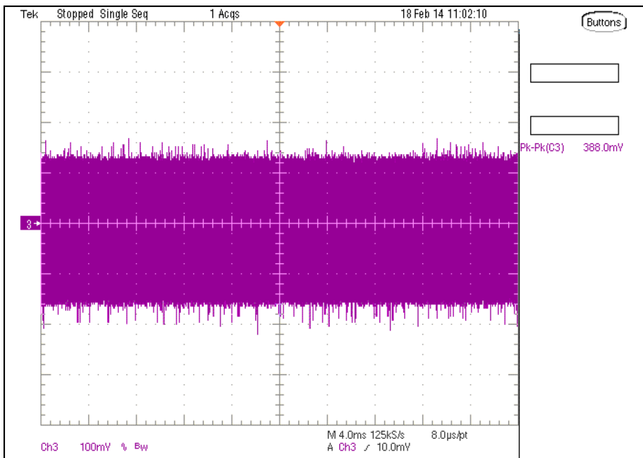
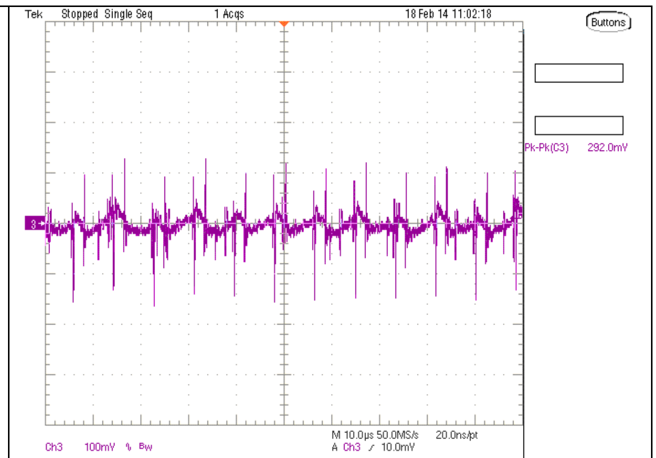
	
SMB Alert PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz. CH3: SMB Alert Vp-p	SMB Alert L PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz. CH3: SMB Alert Vp-p

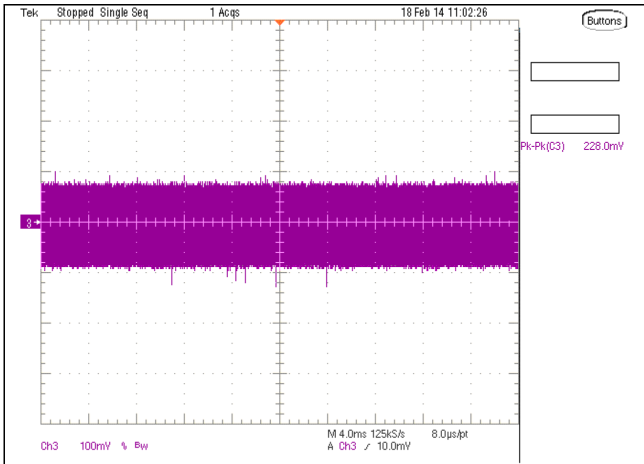
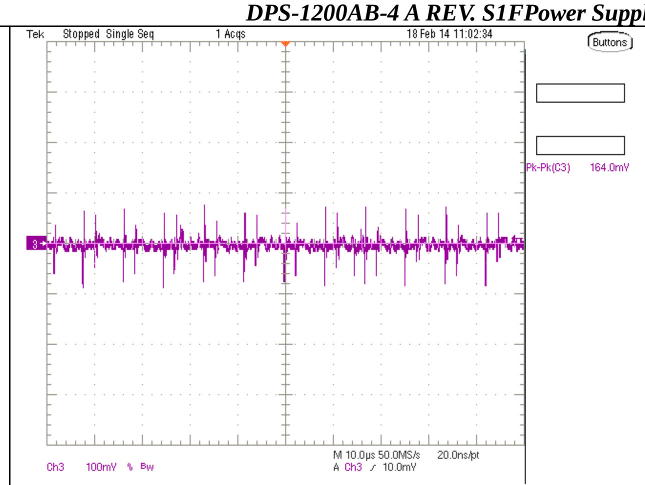
	
SMB Alert PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz. CH3: SMB Alert Vp-p	SMB Alert PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz. CH3: SMB Alert Vp-p

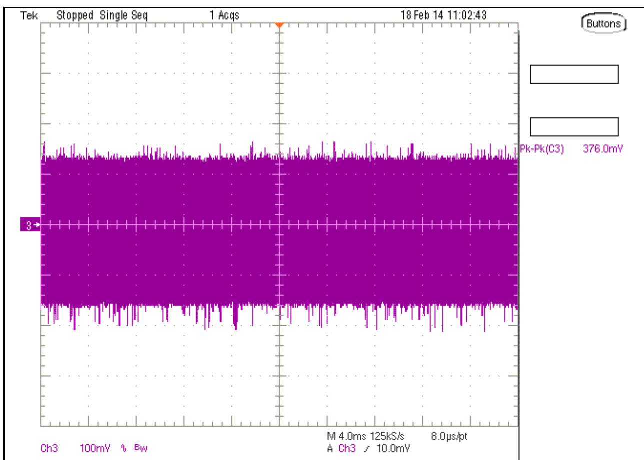
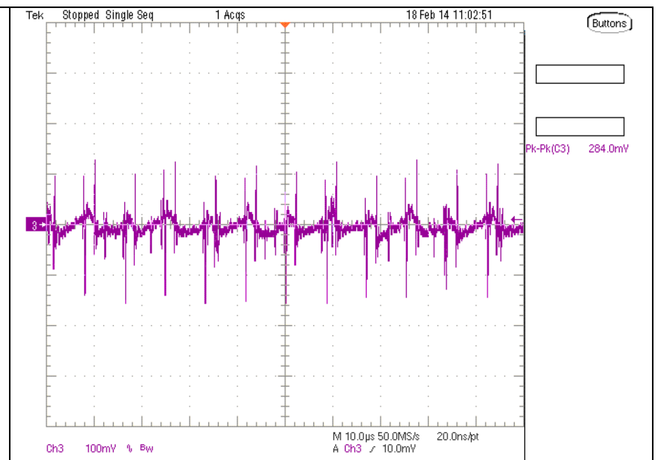
	
SMB Alert PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz. CH3: SMB Alert Vp-p	SMB Alert PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz. CH3: SMB Alert Vp-p

	
SMB Alert PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz. CH3: SMB Alert Vp-p	SMB Alert PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz. CH3: SMB Alert Vp-p

	
SMB Alert PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz. CH3: SMB Alert Vp-p	SMB Alert PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz. CH3: SMB Alert Vp-p

	
SMB Alert PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz. CH3: SMB Alert Vp-p	SMB Alert PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz. CH3: SMB Alert Vp-p

	
SMB Alert PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz. CH3: SMB Alert Vp-p	SMB Alert PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz. CH3: SMB Alert Vp-p

	
SMB Alert PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz. CH3: SMB Alert Vp-p	SMB Alert PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz. CH3: SMB Alert Vp-p

6.6.1 Fast SMBALERT

The SMBALERT signal is also used for CPU turbo mode support. This functionality is called ‘Fast SMBALERT’. When the PSU experiences an over power situation, SMBALERT will be asserted within 20us. Afterwards, SMBALERT is latched for 100ms and will be reset by the PSU itself. The ‘Fast SMBALERT’ is not indicated via
PMBus.

6.7 Smart ON

Via SMART_ON interface (B22) the different PSU’s are communicating to control the Smart_ON mode. All SMART_ON signals of the different PSUs must be connected on system side.

Test conditions:

Sample NO.1+1

AMB. 25℃

Graphical Result: N/T

6.8 Function Table

Table21: Function Table

	Output		Remarks
	+12V	+12VSB	
PSU waiting for command	OFF	ON	First AC ON
Command OFF	OFF	ON	And PSON stays high level
Command ON	ON	ON	Or PSON is low

6.9 12VS and RETERN_S

Please refer to the 3.2.9.

6.10 12VLS

Load share is a shared line between the PSU modules that allows dynamic load sharing (within 10%) between redundant Power Supplies.Please refer to the 4.9.1 detail.

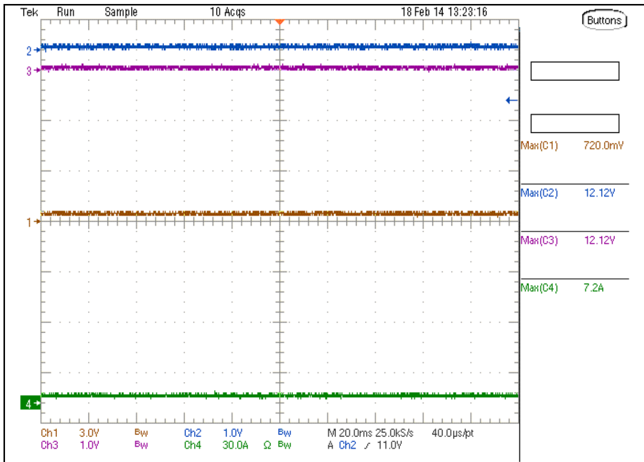
Test conditions:

Sample NO.1

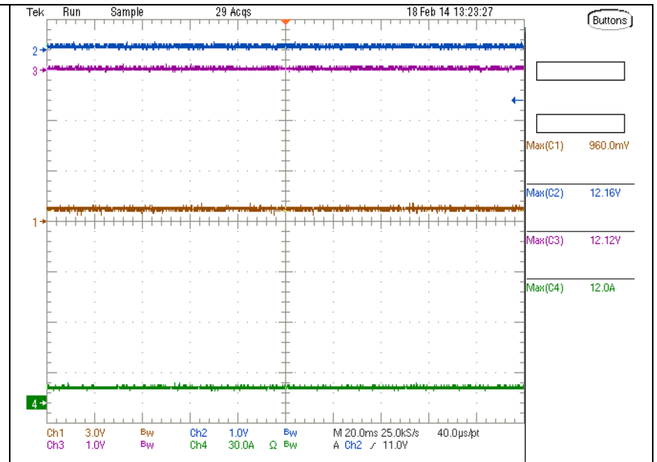
AMB. 25℃

Graphical Result: PASS

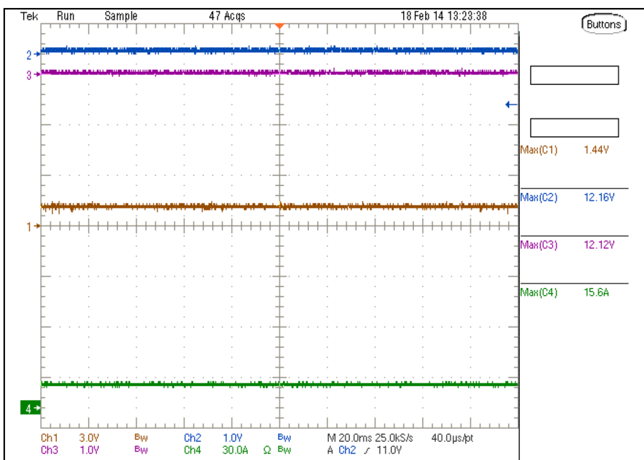
Test Condition	Pout	12VLS Max (V)	12V Current Max (A)	Test Result
12VLS Output test at Vin=200Vac/60Hz and Iout=5% load	59.940	0.600	7.200	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=10% load	119.246	0.960	10.800	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=15% load	178.755	1.440	15.600	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=20% load	238.076	1.800	20.400	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=25% load	298.119	2.160	25.200	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=30% load	357.449	2.640	30.000	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=35% load	416.853	3.120	34.800	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=40% load	478.064	3.480	39.600	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=45% load	536.933	3.840	44.400	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=50% load	596.596	4.200	49.200	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=55% load	656.039	4.680	54.000	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=60% load	714.244	5.040	58.800	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=65% load	773.574	5.520	63.600	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=70% load	833.338	5.760	68.400	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=75% load	892.463	6.240	73.200	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=80% load	953.054	6.720	78.000	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=85% load	1012.399	7.080	82.800	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=90% load	1072.148	7.440	87.600	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=95% load	1131.503	7.920	92.400	PASS
12VLS Output test at Vin=200Vac/60Hz and Iout=100% load	1190.858	8.280	96.000	PASS



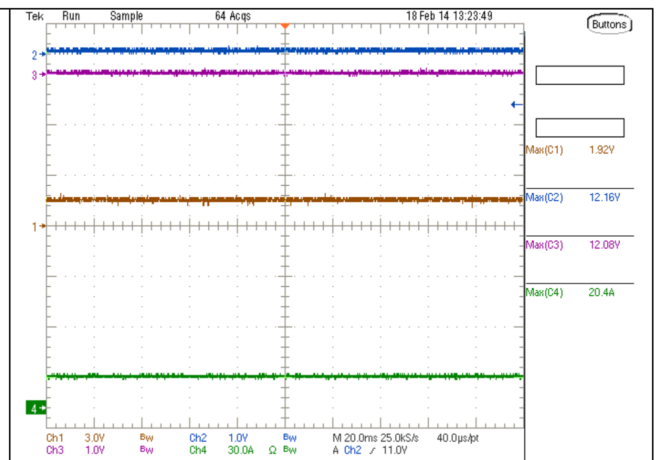
12VLS Output test at Vin=200Vac/60Hz and Iout=5% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



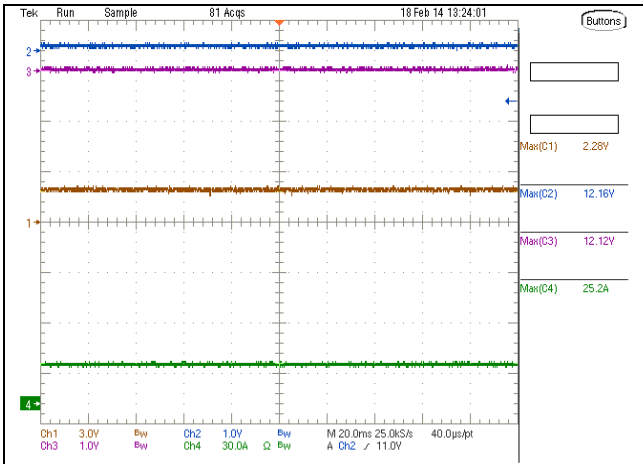
12VLS Output test at Vin=200Vac/60Hz and Iout=10% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



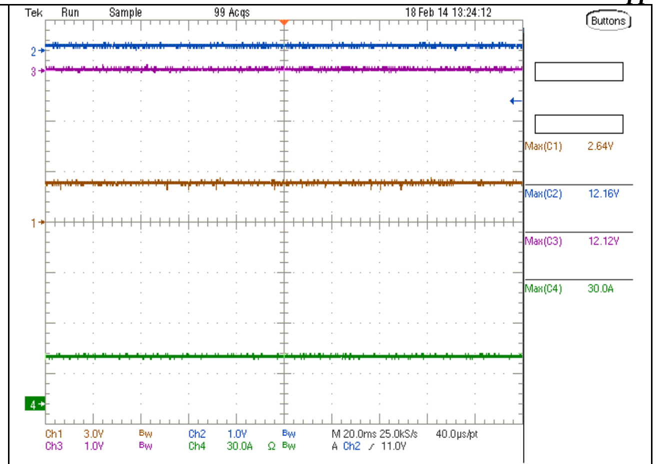
12VLS Output test at Vin=200Vac/60Hz and Iout=15% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



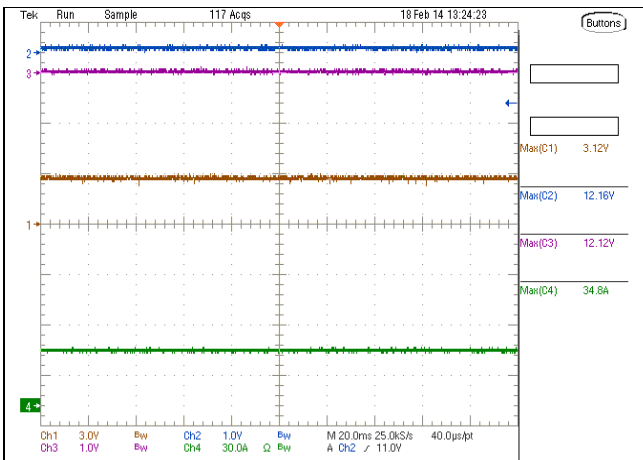
12VLS Output test at Vin=200Vac/60Hz and Iout=20% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



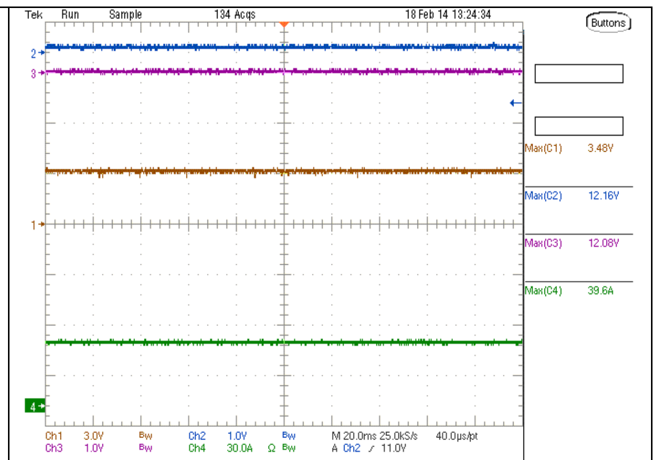
12VLS Output test at Vin=200Vac/60Hz and Iout=25% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



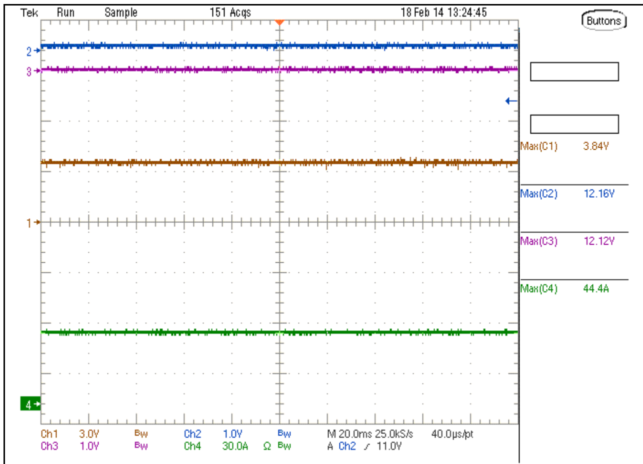
12VLS Output test at Vin=200Vac/60Hz and Iout=30% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



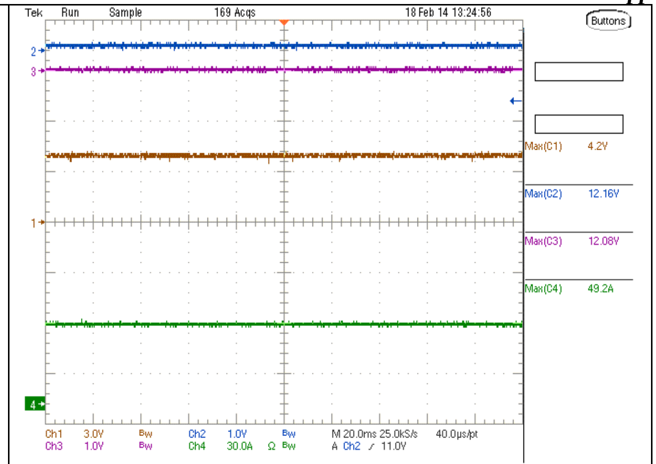
12VLS Output test at Vin=200Vac/60Hz and Iout=35% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



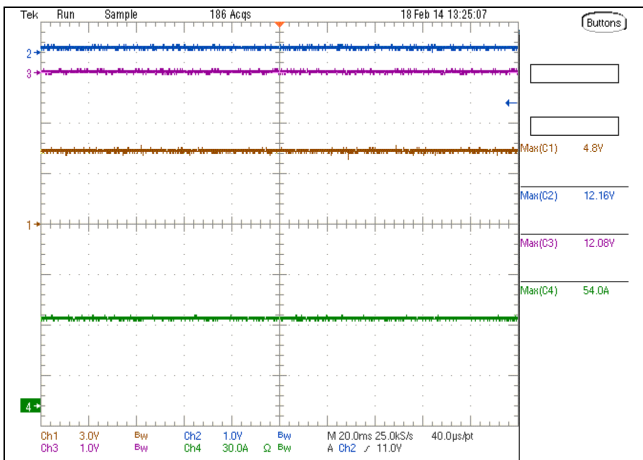
12VLS Output test at Vin=200Vac/60Hz and Iout=40% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



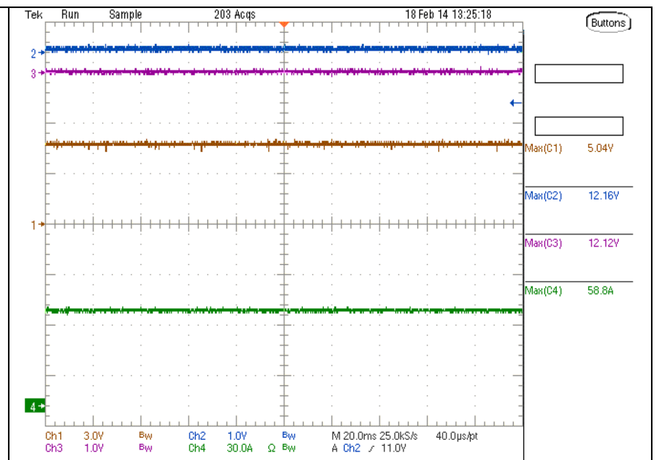
12VLS Output test at Vin=200Vac/60Hz and Iout=45% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



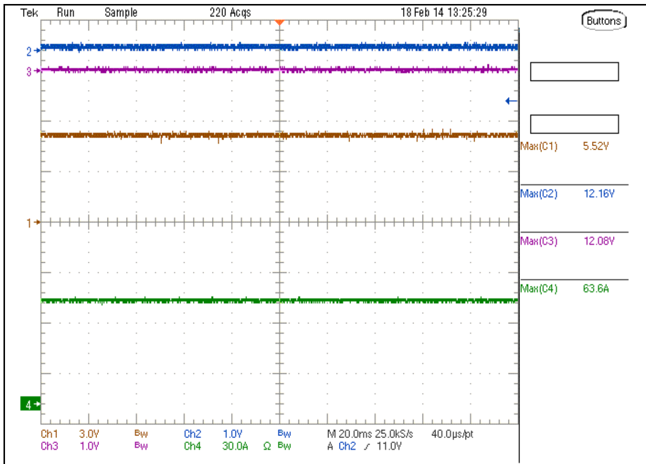
12VLS Output test at Vin=200Vac/60Hz and Iout=50% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



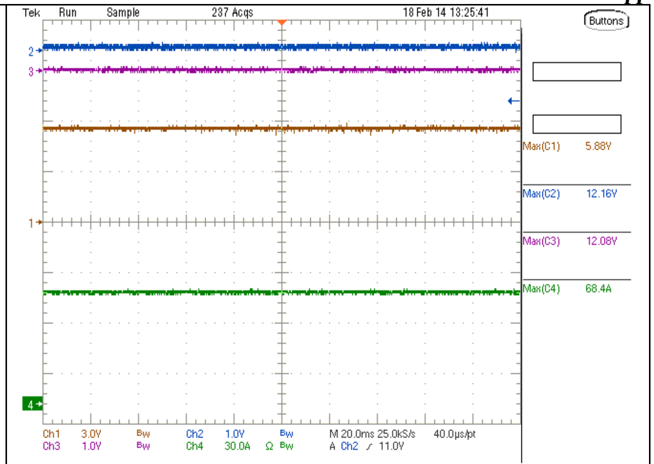
12VLS Output test at Vin=200Vac/60Hz and Iout=55% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



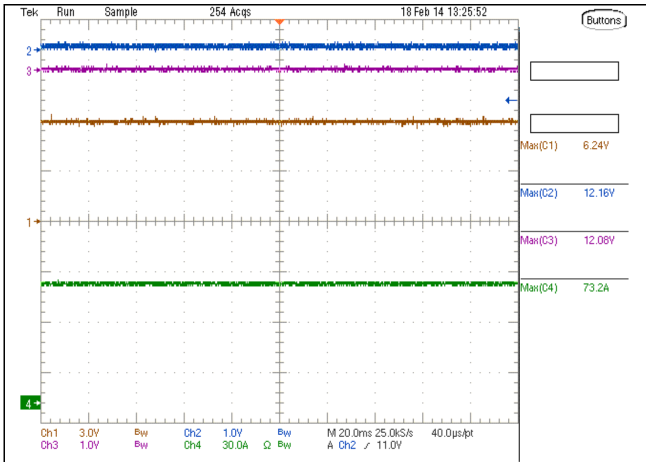
12VLS Output test at Vin=200Vac/60Hz and Iout=60% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



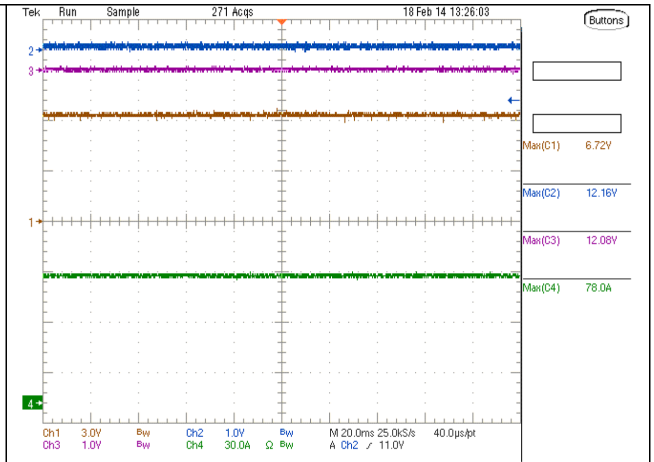
12VLS Output test at Vin=200Vac/60Hz and Iout=65% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



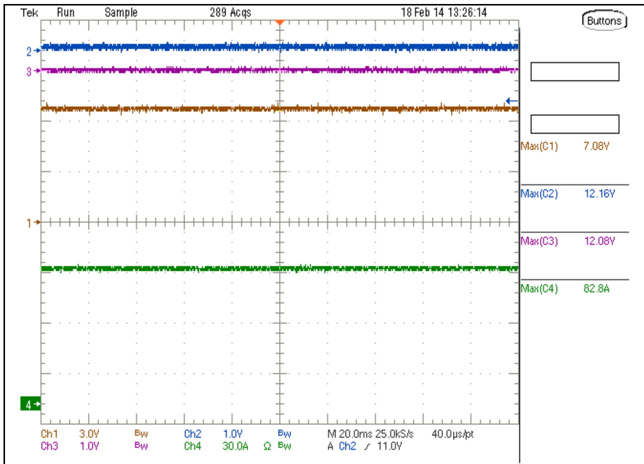
12VLS Output test at Vin=200Vac/60Hz and Iout=70% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



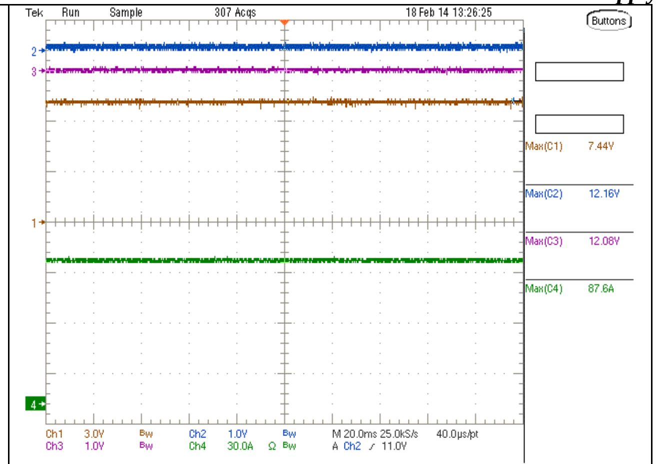
12VLS Output test at Vin=200Vac/60Hz and Iout=75% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



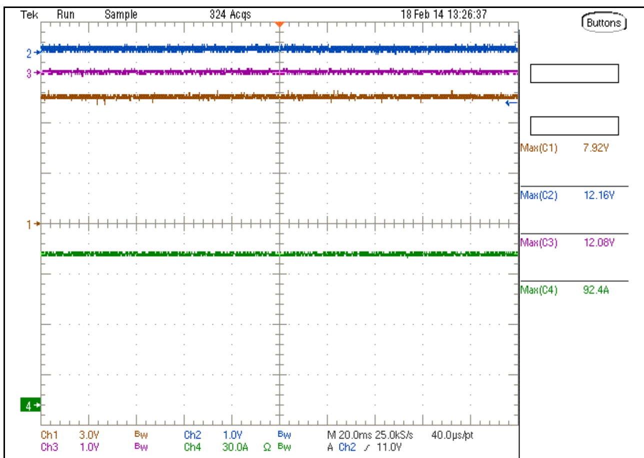
12VLS Output test at Vin=200Vac/60Hz and Iout=80% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



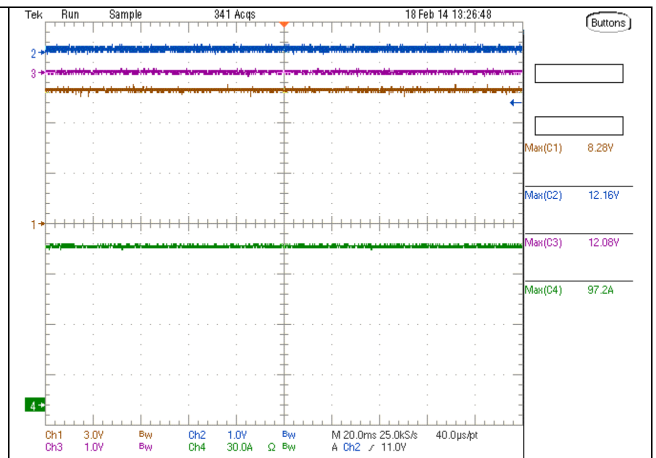
12VLS Output test at Vin=200Vac/60Hz and Iout=85% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



12VLS Output test at Vin=200Vac/60Hz and Iout=90% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



12VLS Output test at Vin=200Vac/60Hz and Iout=95% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current



12VLS Output test at Vin=200Vac/60Hz and Iout=100% load
(1) 12VLS
(2) 12V
(3) 12Vsb
(4) 12V Current

6.11 SDA and SCL

One pin is the serial clock (SCL), and the other pin is used for serial data (SDA). The SCL and SDA signals are pulled up by system, both pins are bi-directional, open drain signals, and are used to form a serial bus

Turn-on Mode: Read Register 0x79h, Read Data: 0x0000h

Standby Mode: Read Register 0x79h, Read Data: 0x0840h

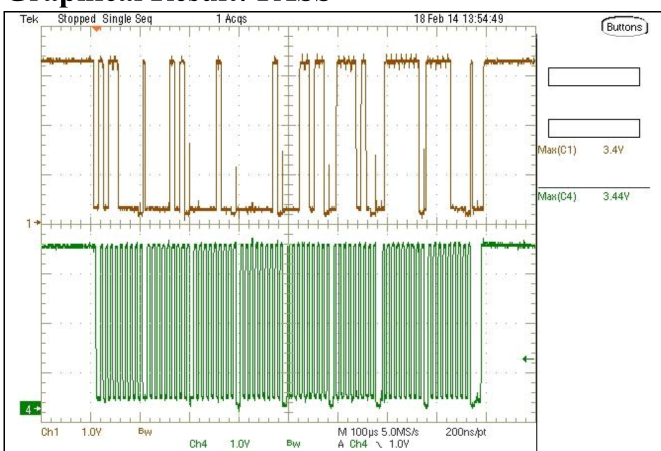
Test conditions:

Sample NO.1

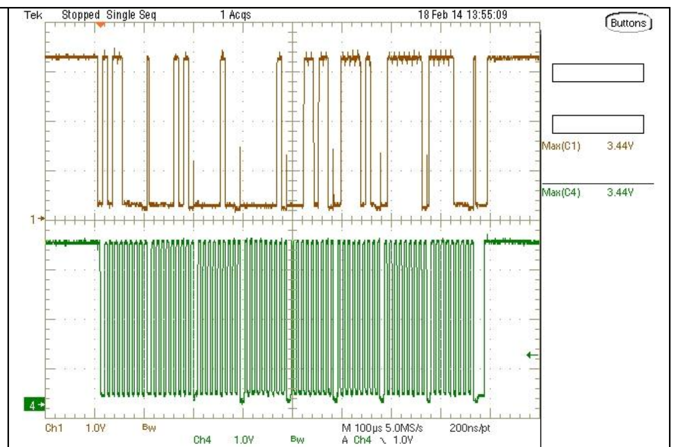
AMB. 25℃

TEST 1	90V/47Hz	+12V/82A, +12Vsb/2A
TEST 2	90V/47Hz	+12V/0.5A, +12Vsb/0.05A
TEST 3	100V/60Hz	+12V/82A, +12Vsb/2A
TEST 4	100V/60Hz	+12V/0.5A, +12Vsb/0.05A
TEST 5	200V/60Hz	+12V/98A, +12Vsb/2A
TEST 6	200V/60Hz	+12V/0.5A, +12Vsb/0.05A
TEST 7	264V/63Hz	+12V/98A, +12Vsb/2A
TEST 8	264V/63Hz	+12V/0.5A, +12Vsb/0.05A

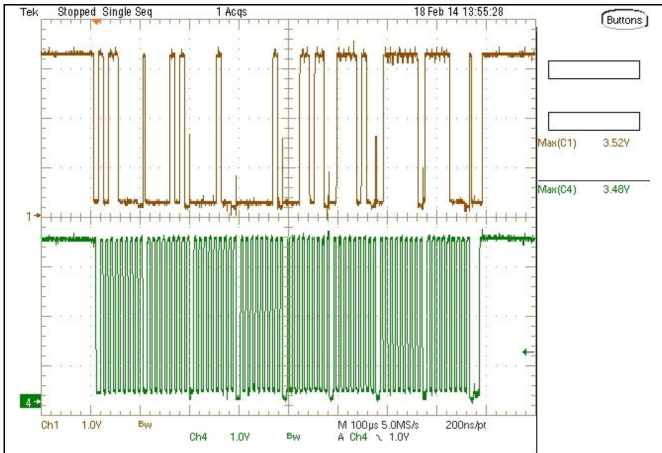
Graphical Result: PASS



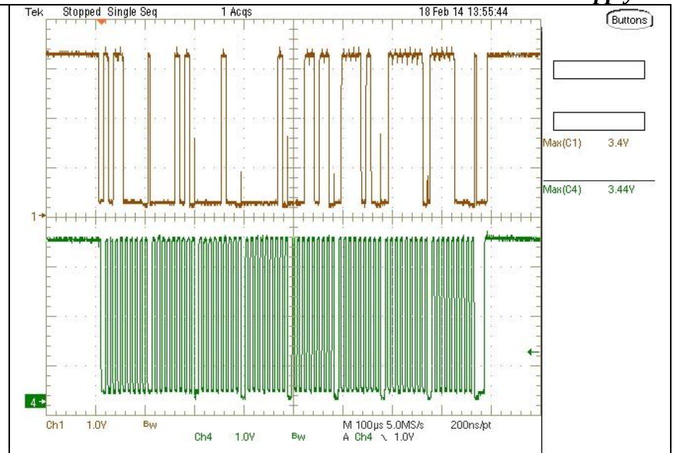
Test condition: TEST1
CH1: SDA
CH4: SCL



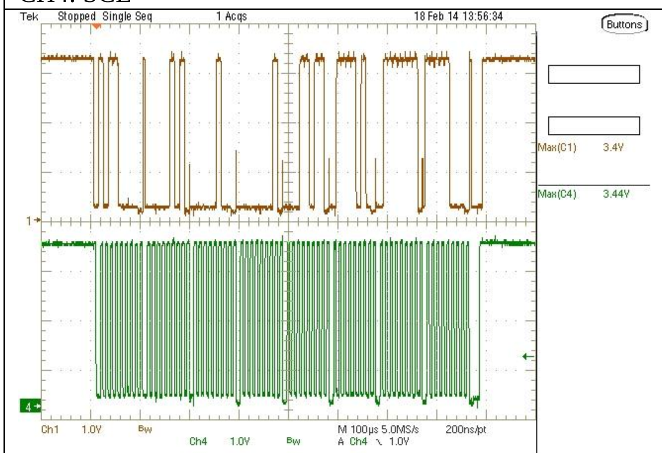
Test condition: TEST2
CH1: SDA
CH4: SCL



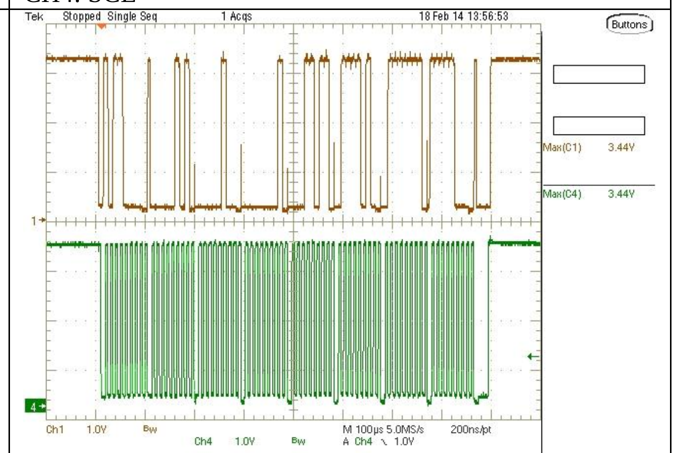
Test condition: TEST3
CH1: SDA
CH4: SCL



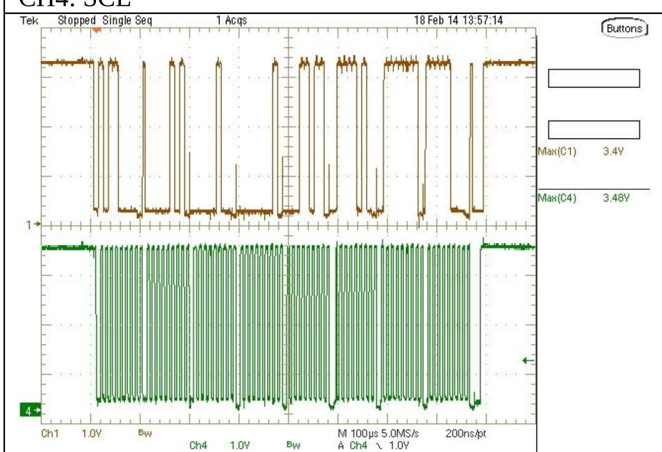
Test condition: TEST4
CH1: SDA
CH4: SCL



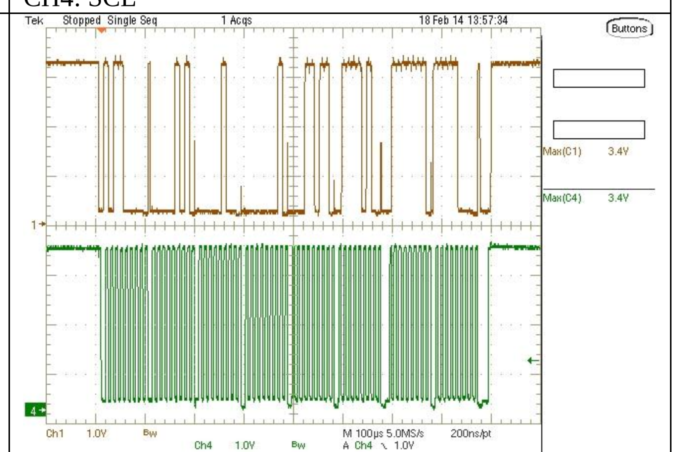
Test condition: TEST5
CH1: SDA
CH4: SCL



Test condition: TEST6
CH1: SDA
CH4: SCL



Test condition: TEST7
CH1: SDA
CH4: SCL



Test condition: TEST8
CH1: SDA
CH4: SCL

6.11 SDA and SCL

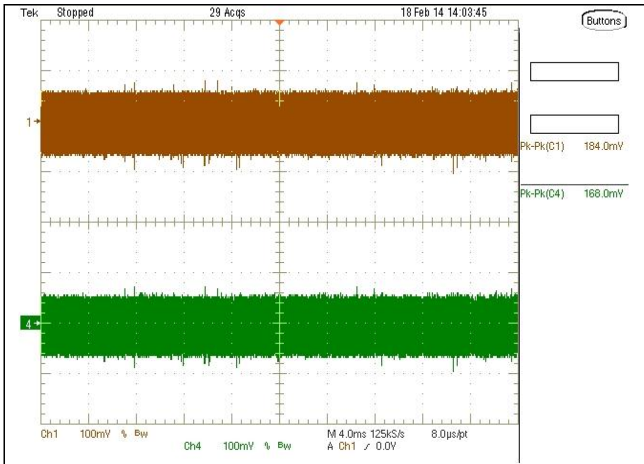
Test conditions:

Sample NO.1

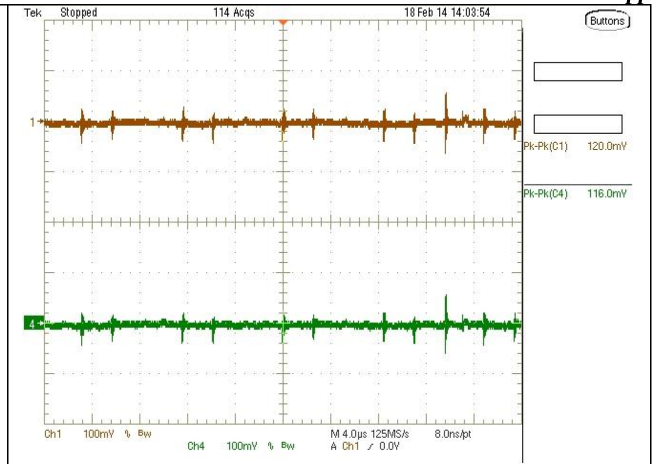
AMB. 25℃

Graphical Result: PASS

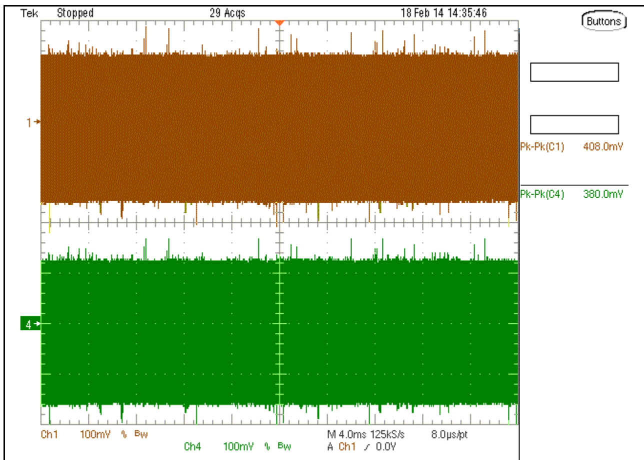
Test Condition	SDA Reading (mVp-p)	SCL Reading (mVp-p)	Result
SDA SCL PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.	184.00	168.00	PASS
SDA SCL PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.	120.00	116.00	PASS
SDA SCL PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.	408.00	380.00	PASS
SDA SCL PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.	320.00	316.00	PASS
SDA SCL PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.	184.00	172.00	PASS
SDA SCL PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.	120.00	120.00	PASS
SDA SCL PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.	416.00	404.00	PASS
SDA SCL PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.	284.00	276.00	PASS
SDA SCL PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.	172.00	164.00	PASS
SDA SCL PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz.	124.00	112.00	PASS
SDA SCL PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.	412.00	404.00	PASS
SDA SCL PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz.	300.00	288.00	PASS
SDA SCL PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.	164.00	160.00	PASS
SDA SCL PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.	112.00	108.00	PASS
SDA SCL PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.	412.00	396.00	PASS
SDA SCL PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.	296.00	292.00	PASS



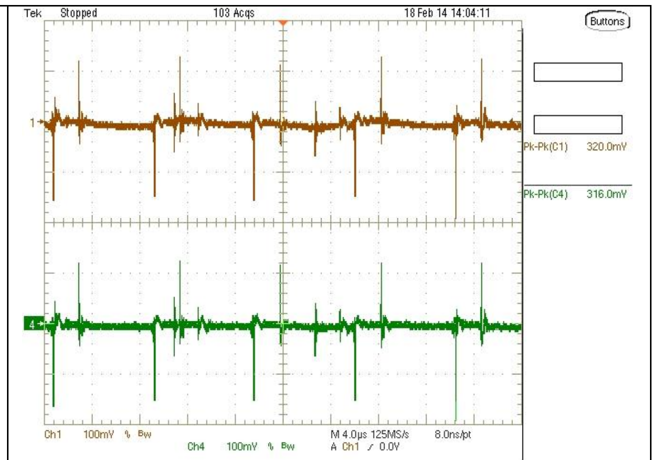
SDA SCL PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



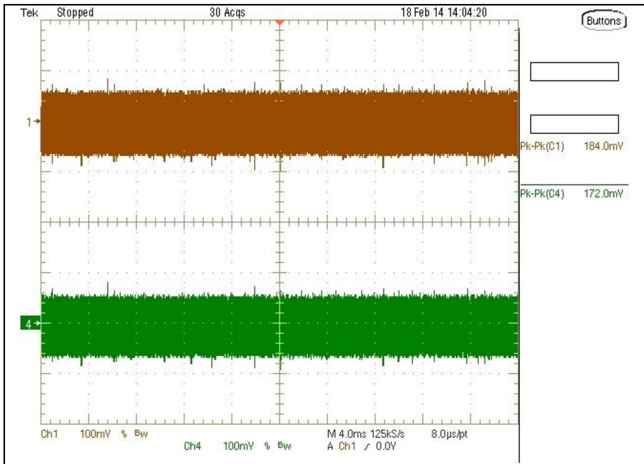
SDA SCL PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



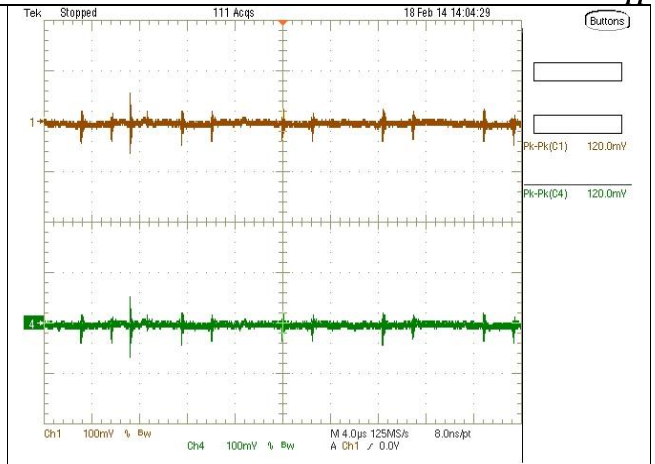
SDA SCL PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



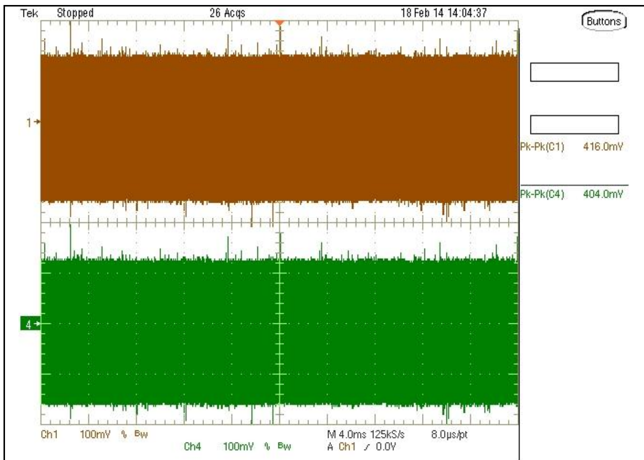
SDA SCL PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



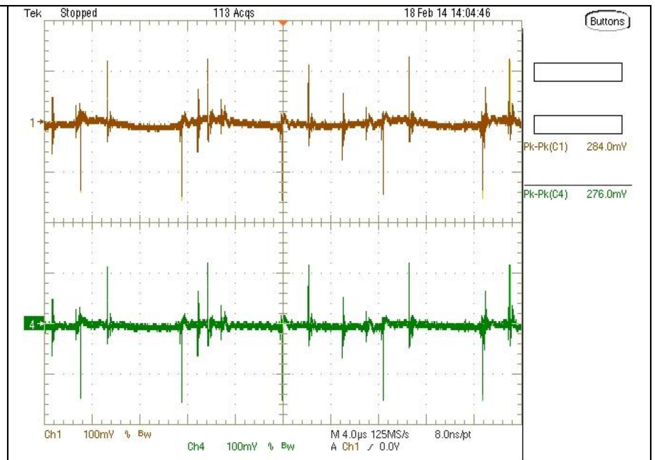
SDA SCL PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



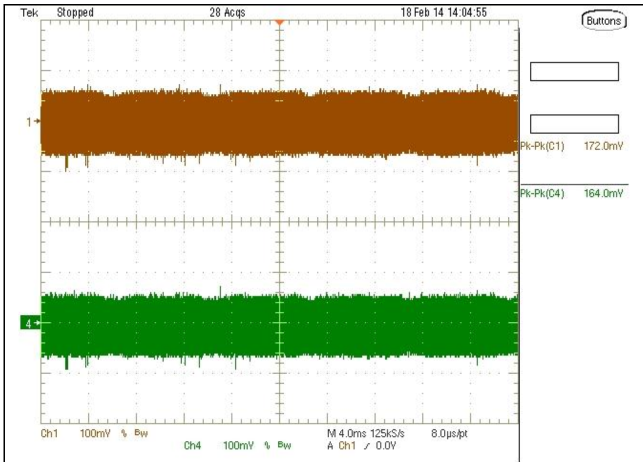
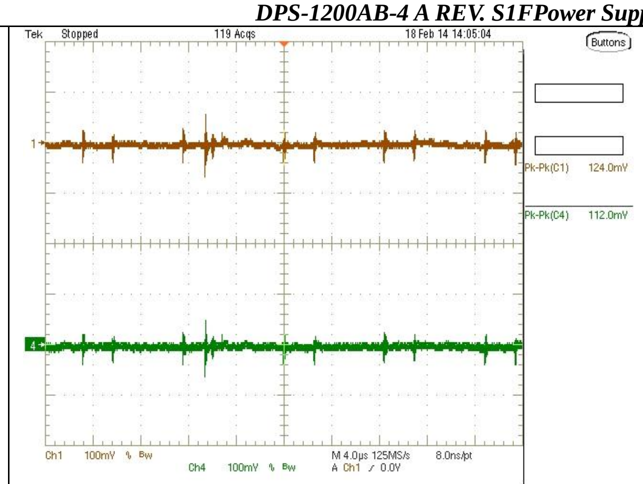
SDA SCL PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p

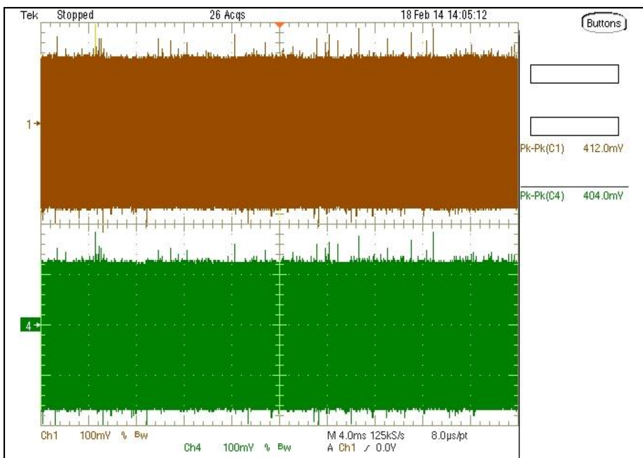
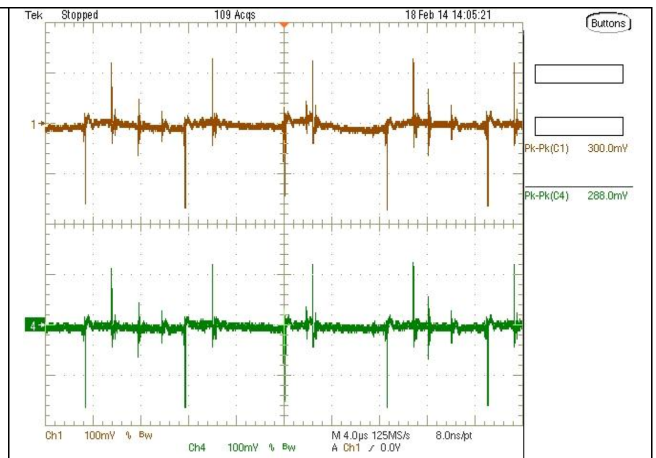


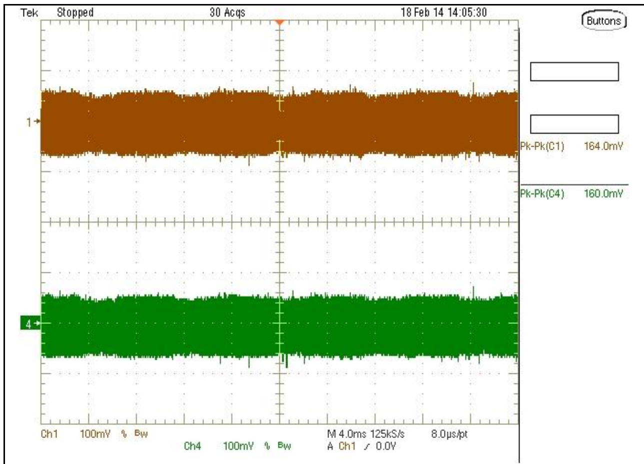
SDA SCL PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



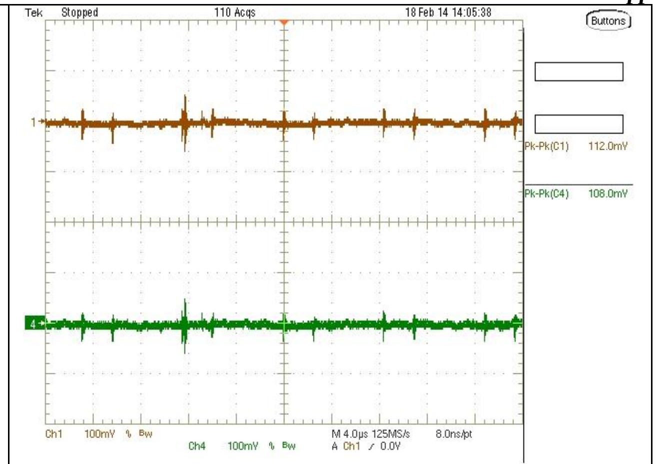
SDA SCL PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p

	
SDA SCL PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz. CH1: SDA Vp-p CH4: SCL Vp-p	SDA SCL PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz. CH1: SDA Vp-p CH4: SCL Vp-p

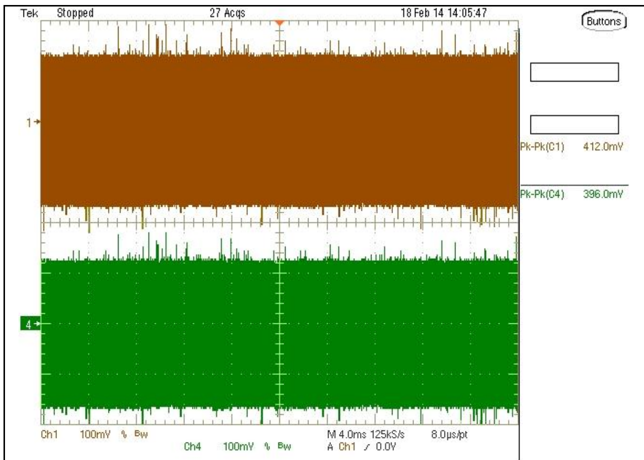
	
SDA SCL PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz. CH1: SDA Vp-p CH4: SCL Vp-p	SDA SCL PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz. CH1: SDA Vp-p CH4: SCL Vp-p



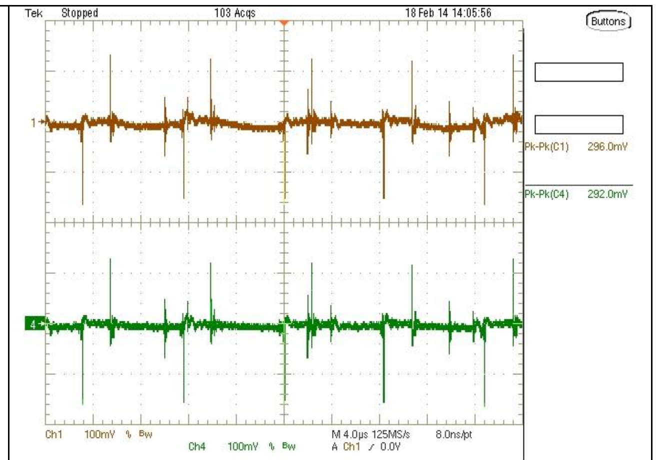
SDA SCL PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



SDA SCL PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



SDA SCL PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p



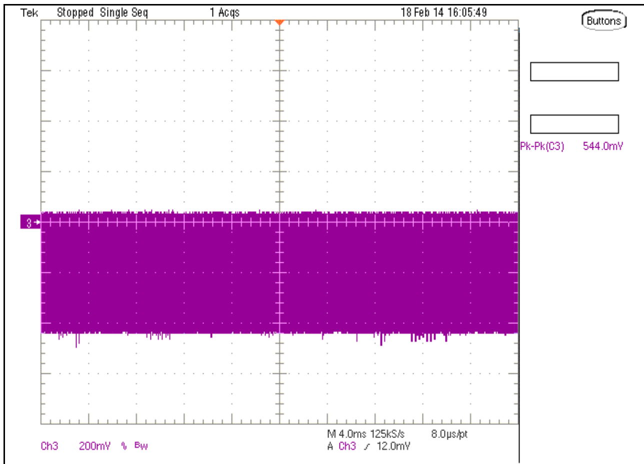
SDA SCL PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz.
CH1: SDA Vp-p
CH4: SCL Vp-p

6.12 A0

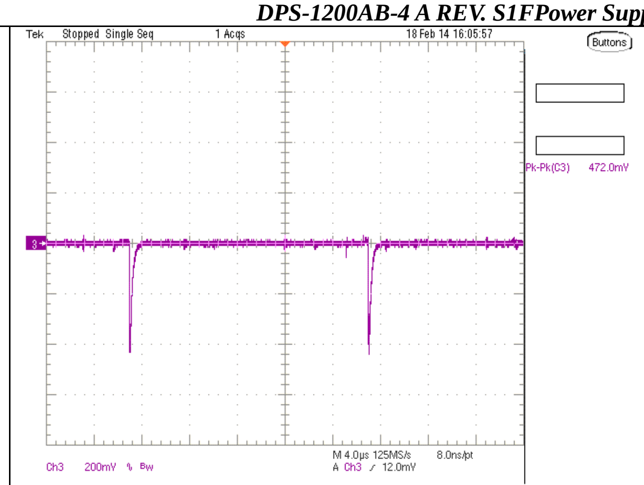
PSU Module Address Line 0. This signal line is provided for determining the address for the specific PSU FRU and SMBus address. The pull-up resister should be located in the PSU and pull-up voltage should be limited to 3.3V. The address line should be either float or pull low with equal to or less than 100 ohm in the motherboard design.

Test conditions:
Sample NO.1
AMB. 25℃
Graphical Result: PASS

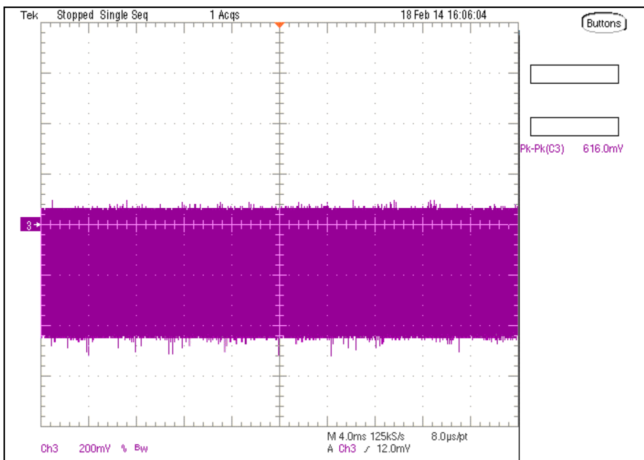
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
A0 PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz to High	*	544.0	PASS
A0 PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz to High	*	472.0	PASS
A0 PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz to High	*	616.0	PASS
A0 PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz to High	*	536.0	PASS
A0 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to High	*	536.0	PASS
A0 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to High	*	472.0	PASS
A0 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to High	*	624.0	PASS
A0 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to High	*	512.0	PASS
A0 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to High	*	544.0	PASS
A0 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to High	*	472.0	PASS
A0 PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz to High	*	648.0	PASS
A0 PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz to High	*	512.0	PASS
A0 PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz to High	*	520.0	PASS
A0 PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz to High	*	472.0	PASS
A0 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to High	*	624.0	PASS
A0 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to High	*	520.0	PASS



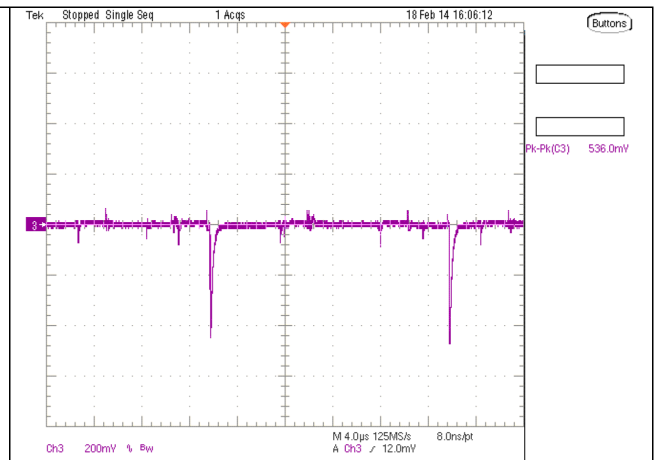
A0 PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz to High
CH3: A0 Vp-p to High



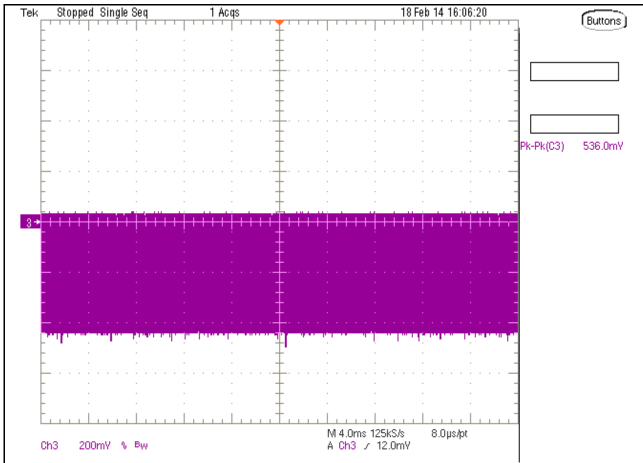
A0 PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz to High
CH3: A0 Vp-p to High



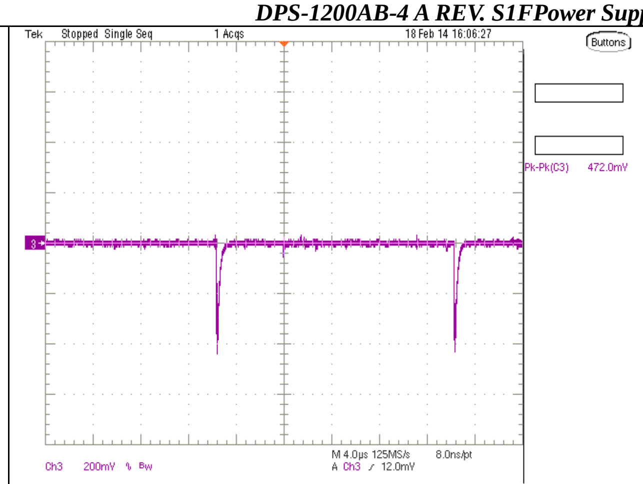
A0 PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz to High
CH3: A0 Vp-p to High



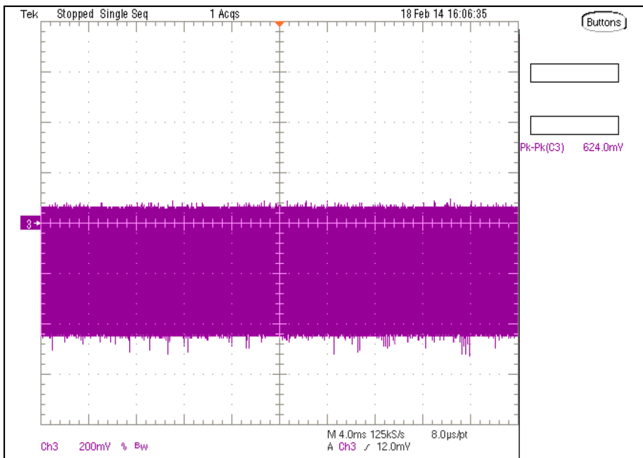
A0 PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz to High
CH3: A0 Vp-p to High



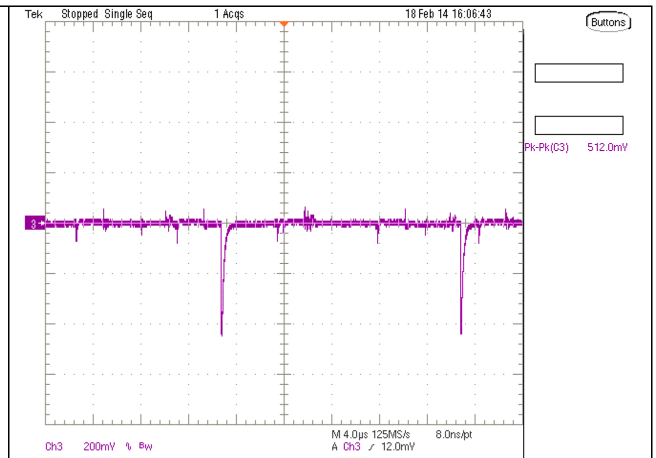
A0 PARD; I/P: 100Vac/60Hz,O/P: Min load
BW: 20MHz to High
CH3: A0 Vp-p to High



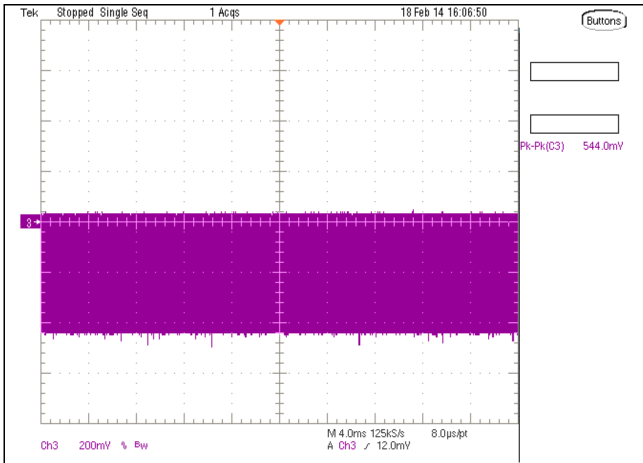
A0 PARD; I/P: 100Vac/60Hz,O/P: Min load
BW: 20MHz to High
CH3: A0 Vp-p to High



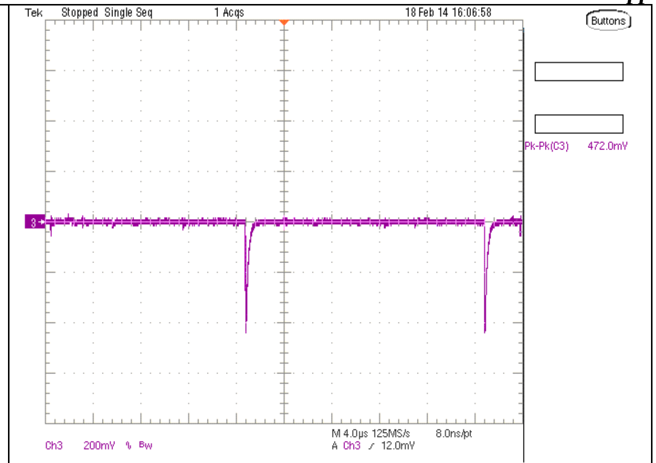
A0 PARD; I/P: 100Vac/60Hz,O/P: Max load
BW: 20MHz to High
CH3: A0 Vp-p to High



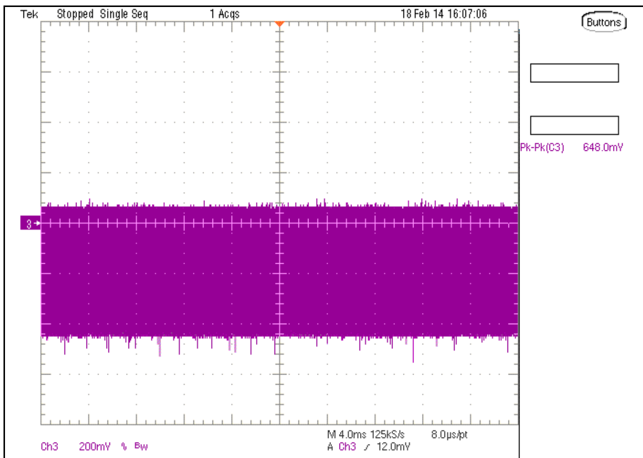
A0 PARD; I/P: 100Vac/60Hz,O/P: Max load
BW: 20MHz to High
CH3: A0 Vp-p to High



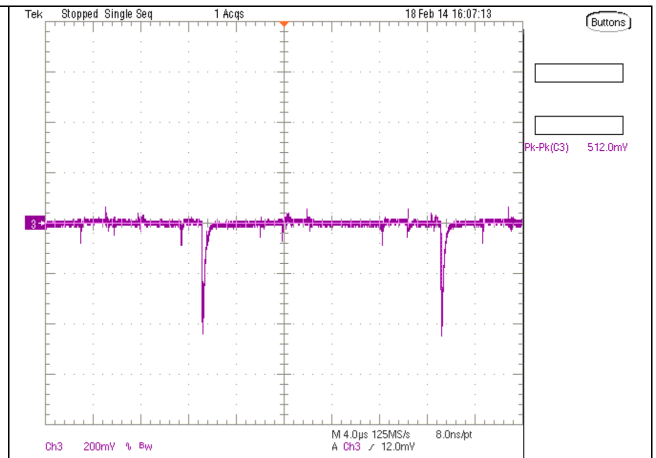
A0 PARD; I/P: 200Vac/60Hz,O/P: Min load
BW: 20MHz to High
CH3: A0 Vp-p to High



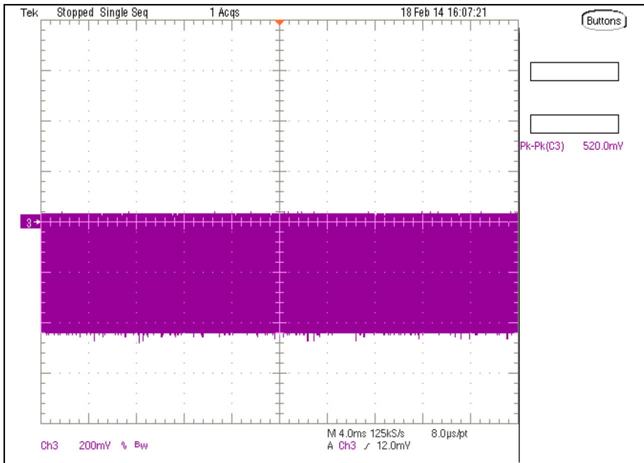
A0 PARD; I/P: 200Vac/60Hz,O/P: Min load
BW: 20MHz to High
CH3: A0 Vp-p to High



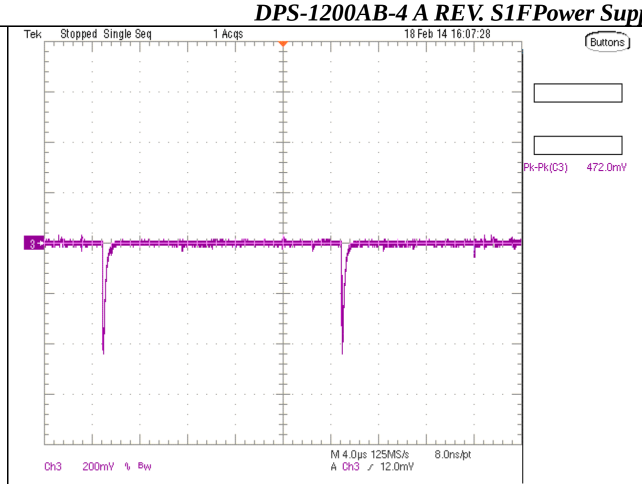
A0 PARD; I/P: 200Vac/60Hz,O/P: Max load
BW: 20MHz to High
CH3: A0 Vp-p to High



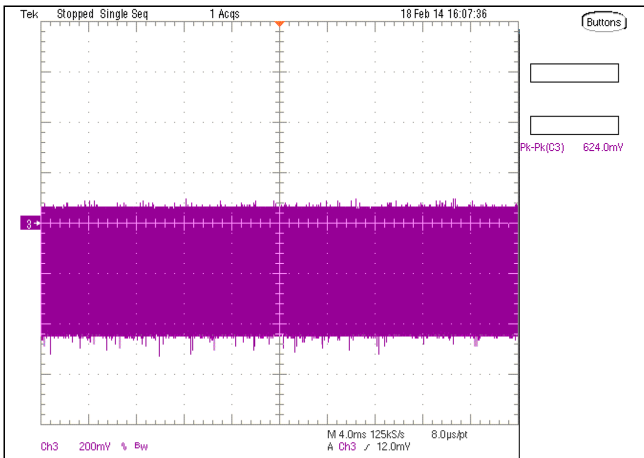
A0 PARD; I/P: 200Vac/60Hz,O/P: Max load
BW: 20MHz to High
CH3: A0 Vp-p to High



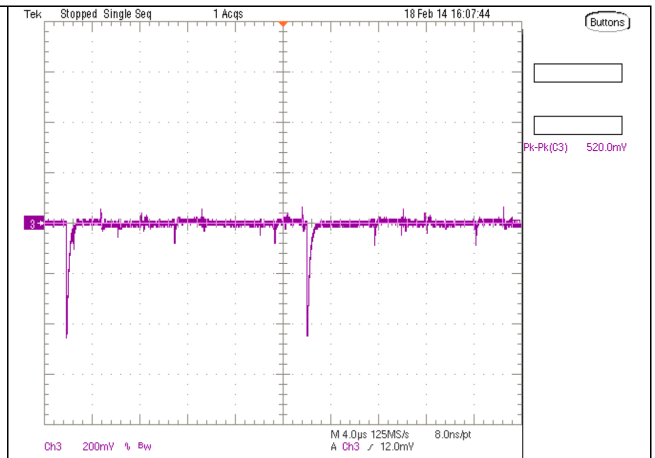
A0 PARD; I/P: 264Vac/63Hz,O/P: Min load
BW: 20MHz to High
CH3: A0 Vp-p to High



A0 PARD; I/P: 264Vac/63Hz,O/P: Min load
BW: 20MHz to High
CH3: A0 Vp-p to High

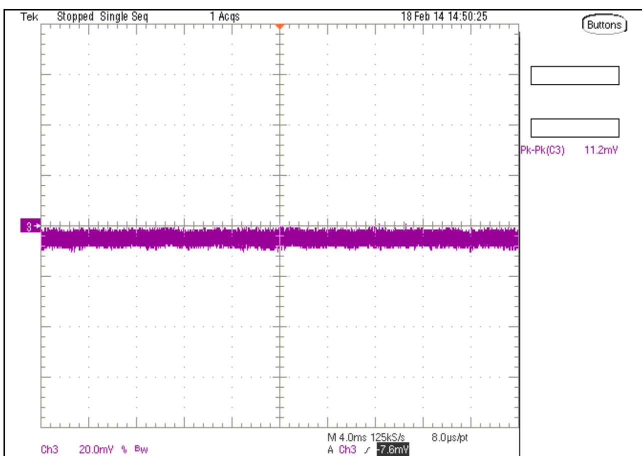


A0 PARD; I/P: 264Vac/63Hz,O/P: Max load
BW: 20MHz to High
CH3: A0 Vp-p to High

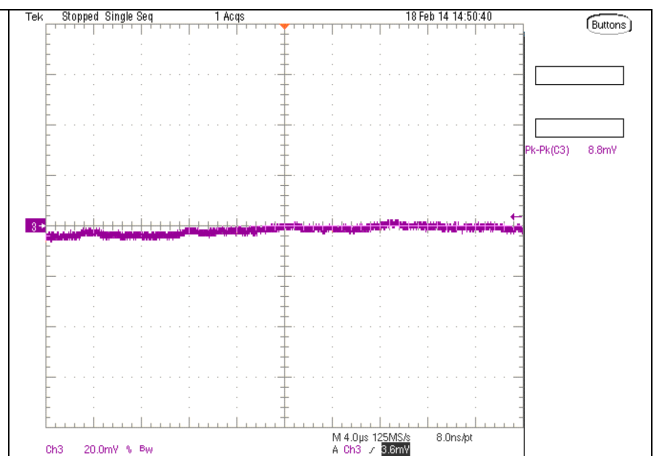


A0 PARD; I/P: 264Vac/63Hz,O/P: Max load
BW: 20MHz to High
CH3: A0 Vp-p to High

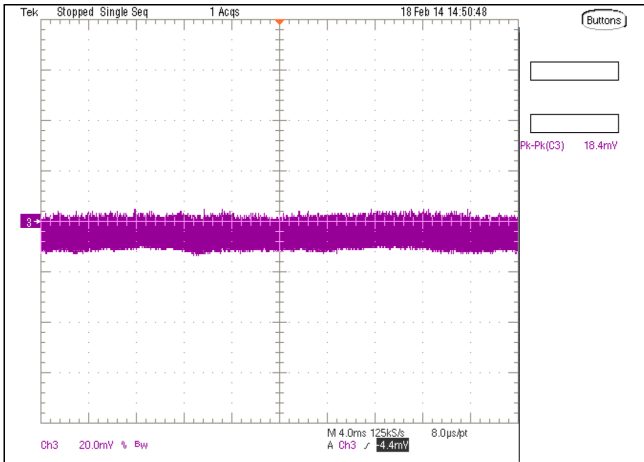
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
A0 PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz to Low	*	11.2	PASS
A0 PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz to Low	*	8.8	PASS
A0 PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz to Low	*	18.4	PASS
A0 PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz to Low	*	12.0	PASS
A0 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to Low	*	11.2	PASS
A0 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to Low	*	6.8	PASS
A0 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to Low	*	16.8	PASS
A0 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to Low	*	14.8	PASS
A0 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to Low	*	12.4	PASS
A0 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to Low	*	7.2	PASS
A0 PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz to Low	*	20.0	PASS
A0 PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz to Low	*	16.8	PASS
A0 PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz to Low	*	12.8	PASS
A0 PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz to Low	*	7.2	PASS
A0 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to Low	*	20.0	PASS
A0 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to Low	*	13.6	PASS



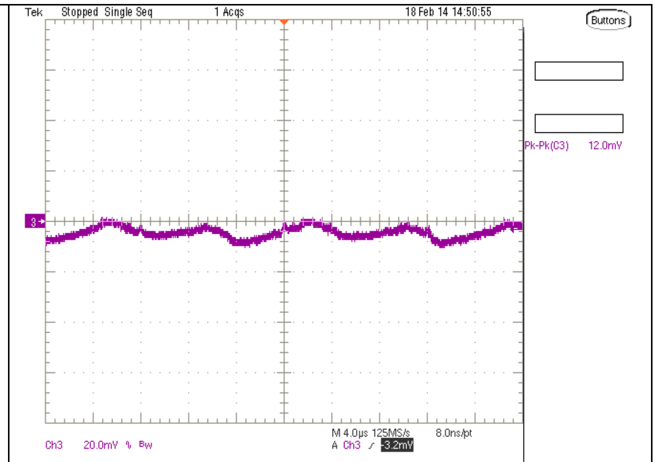
A0 PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz to Low
CH3: A0 Vp-p to Low



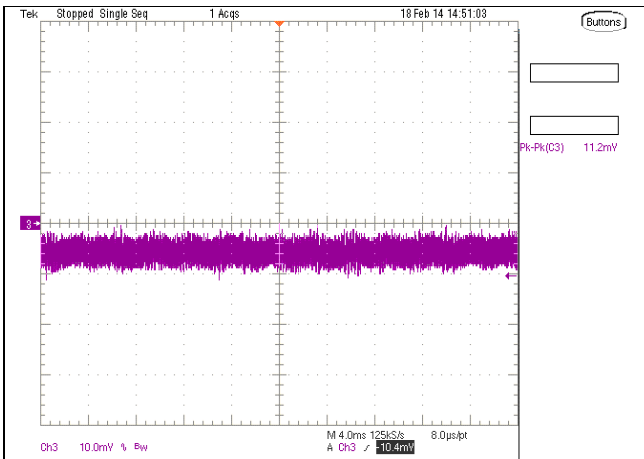
A0 PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz to Low
CH3: A0 Vp-p to Low



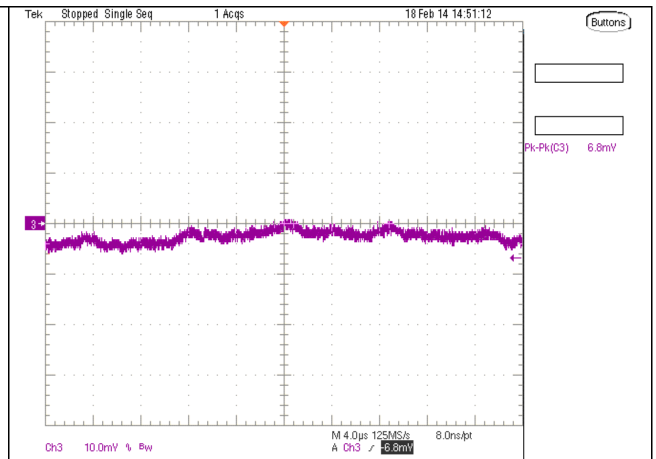
A0 PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz to Low
CH3: A0 Vp-p to Low



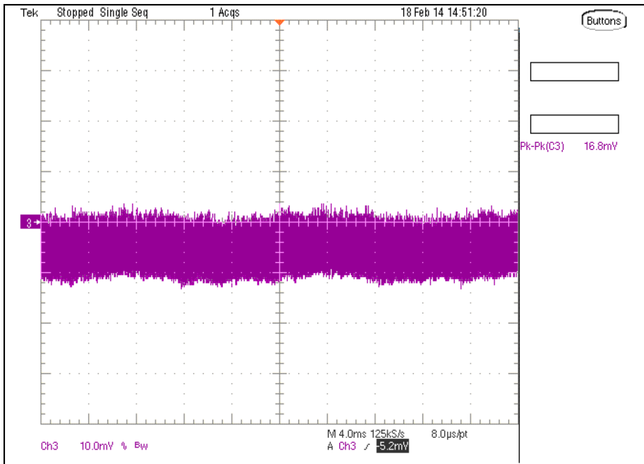
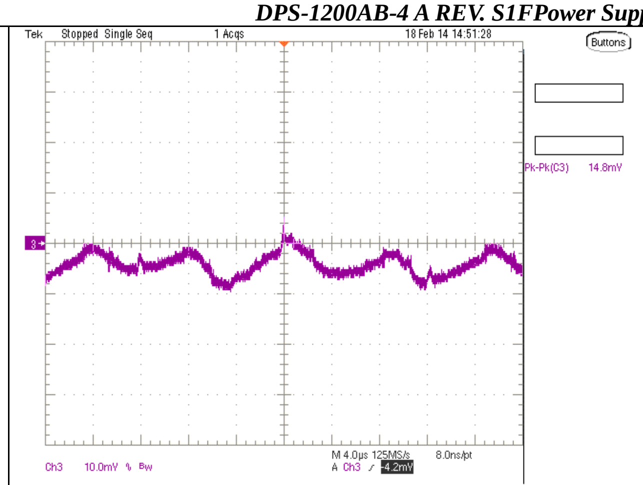
A0 PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz to Low
CH3: A0 Vp-p to Low

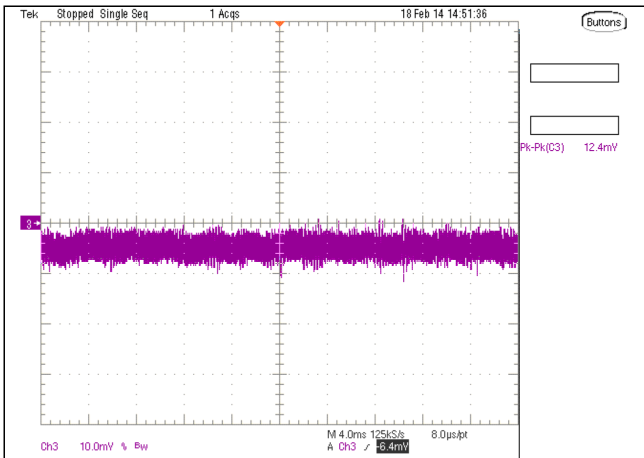
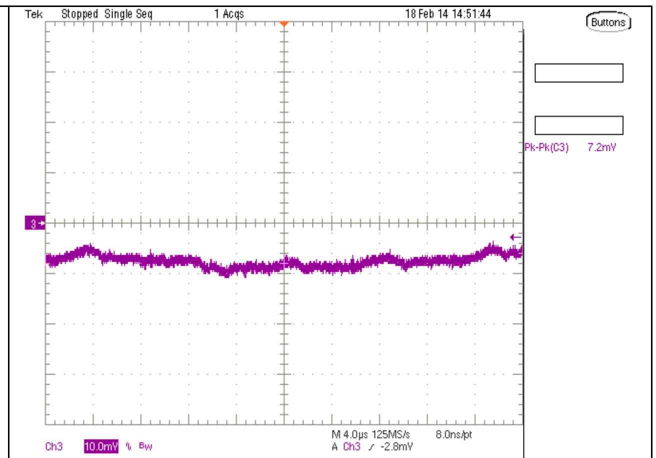


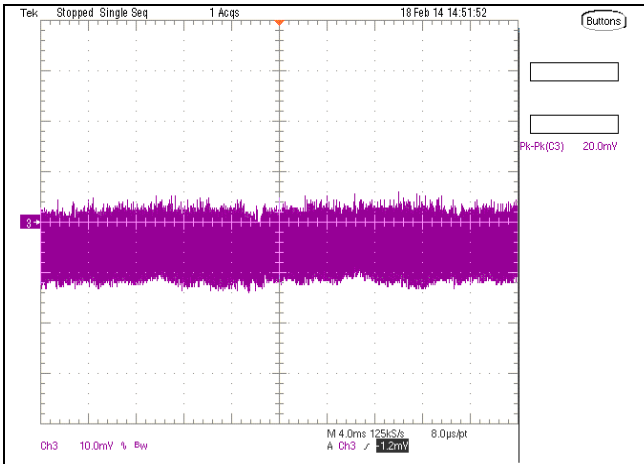
A0 PARD; I/P: 100Vac/60Hz,O/P: Min load
BW: 20MHz to Low
CH3: A0 Vp-p to Low



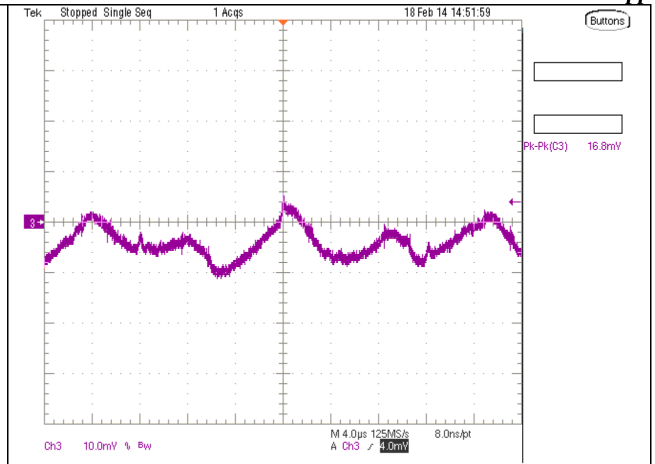
A0 PARD; I/P: 100Vac/60Hz,O/P: Min load
BW: 20MHz to Low
CH3: A0 Vp-p to Low

	
A0 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to Low CH3: A0 Vp-p to Low	A0 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to Low CH3: A0 Vp-p to Low

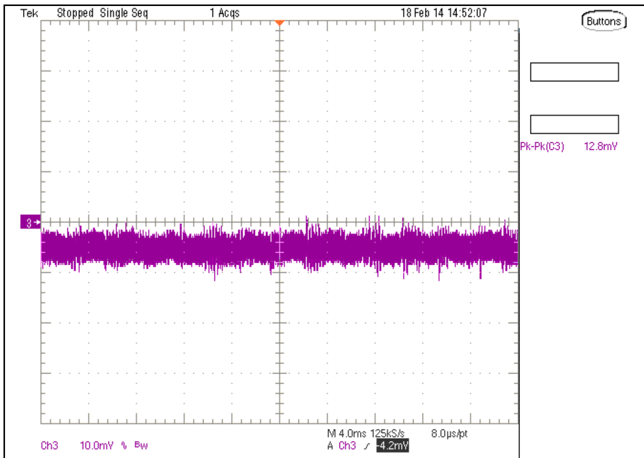
	
A0 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to Low CH3: A0 Vp-p to Low	A0 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to Low CH3: A0 Vp-p to Low



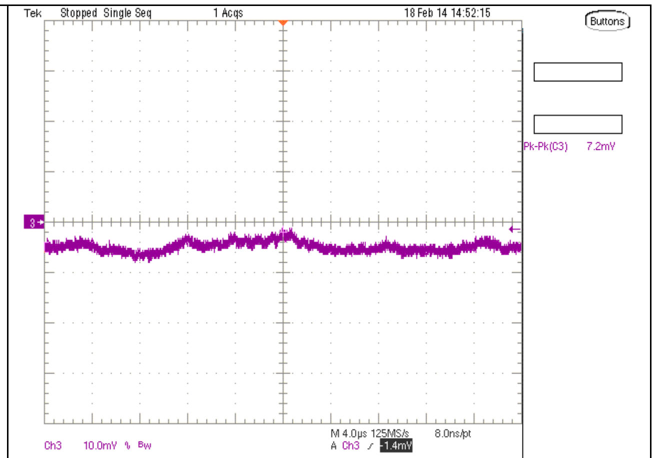
A0 PARD; I/P: 200Vac/60Hz,O/P: Max load
BW: 20MHz to Low
CH3: A0 Vp-p to Low



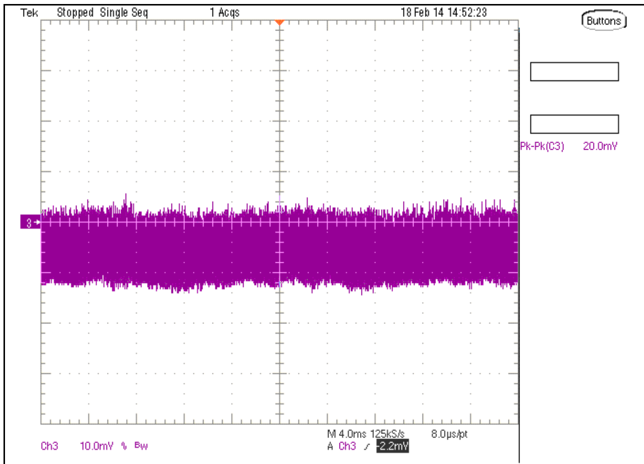
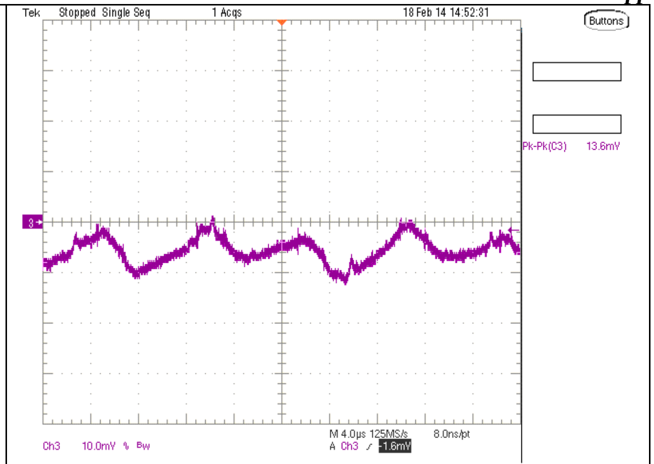
A0 PARD; I/P: 200Vac/60Hz,O/P: Max load
BW: 20MHz to Low
CH3: A0 Vp-p to Low



A0 PARD; I/P: 264Vac/63Hz,O/P: Min load
BW: 20MHz to Low
CH3: A0 Vp-p to Low



A0 PARD; I/P: 264Vac/63Hz,O/P: Min load
BW: 20MHz to Low
CH3: A0 Vp-p to Low

	
A0 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to Low CH3: A0 Vp-p to Low	A0 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to Low CH3: A0 Vp-p to Low

6.13 A1

PSU Module Address Line 1. This signal line is provided for determining the address for the specific PSU FRU and SMBus address. The pull-up resister should be located in the PSU and pull-up voltage should be limited to 3.3V. The address line should be either float or pull low with equal to or less than 100 ohm in the motherboard design.

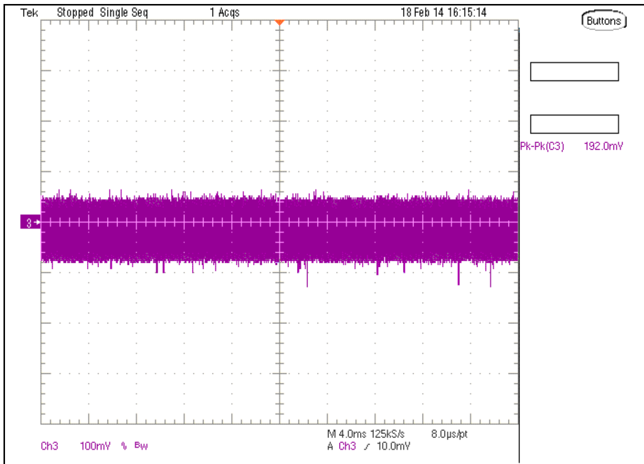
Test conditions:

Sample NO.1

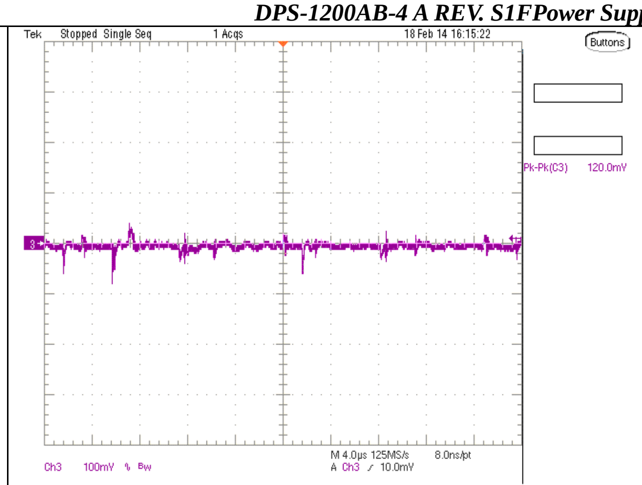
AMB. 25℃

Graphical Result: PASS

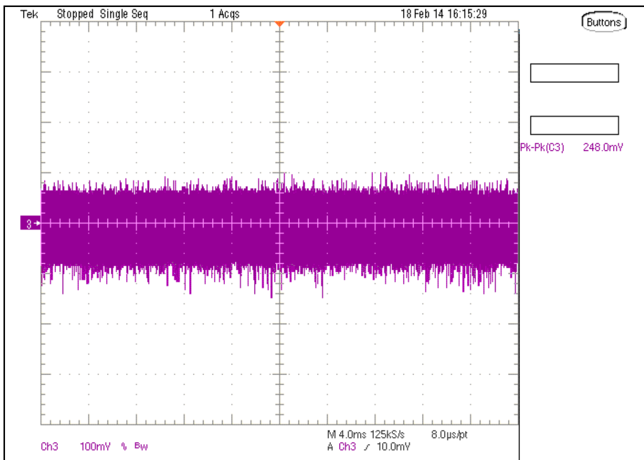
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
A1 PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz to High	*	192.0	PASS
A1 PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz to High	*	120.0	PASS
A1 PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz to High	*	248.0	PASS
A1 PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz to High	*	144.0	PASS
A1 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to High	*	196.0	PASS
A1 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to High	*	76.0	PASS
A1 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to High	*	256.0	PASS
A1 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to High	*	152.0	PASS
A1 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to High	*	184.0	PASS
A1 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to High	*	124.0	PASS
A1 PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz to High	*	256.0	PASS
A1 PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz to High	*	164.0	PASS
A1 PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz to High	*	184.0	PASS
A1 PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz to High	*	120.0	PASS
A1 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to High	*	256.0	PASS
A1 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to High	*	160.0	PASS



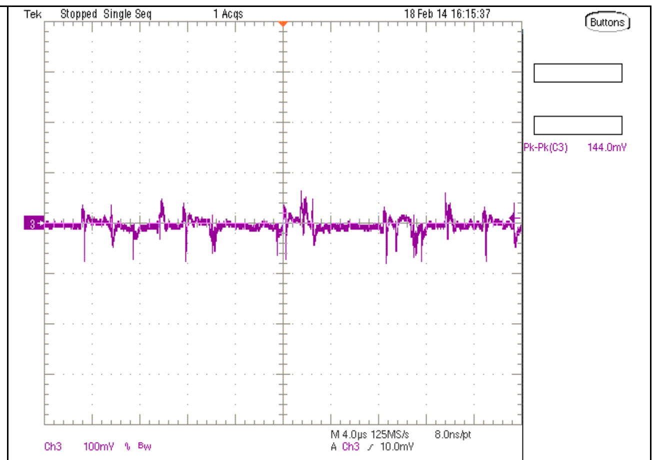
A1 PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz to High
CH3: A1 Vp-p to High



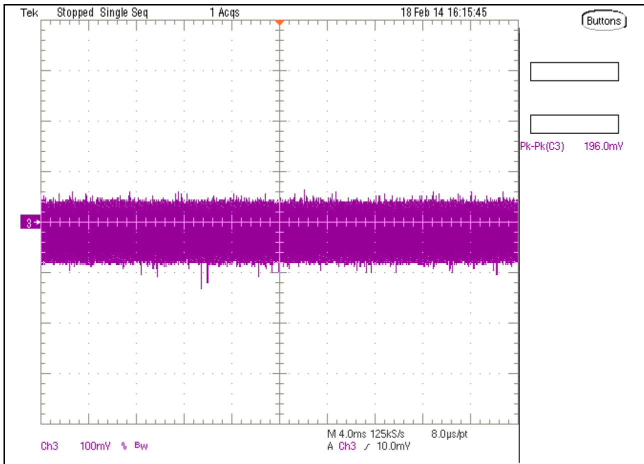
A1 PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz to High
CH3: A1 Vp-p to High



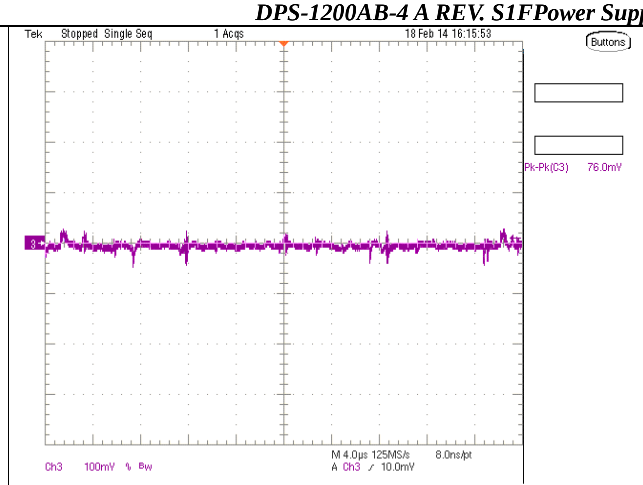
A1 PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz to High
CH3: A1 Vp-p to High



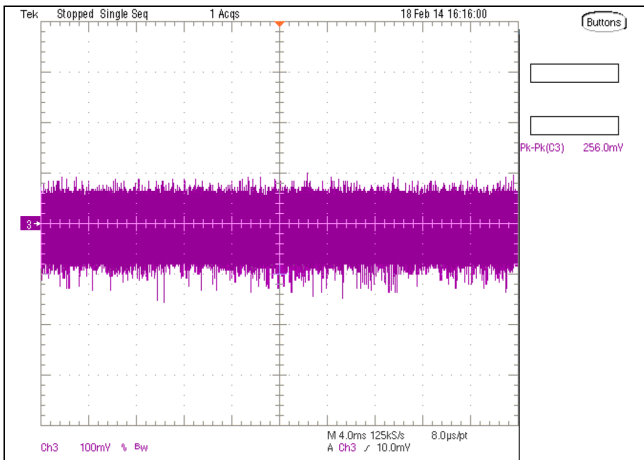
A1 PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz to High
CH3: A1 Vp-p to High



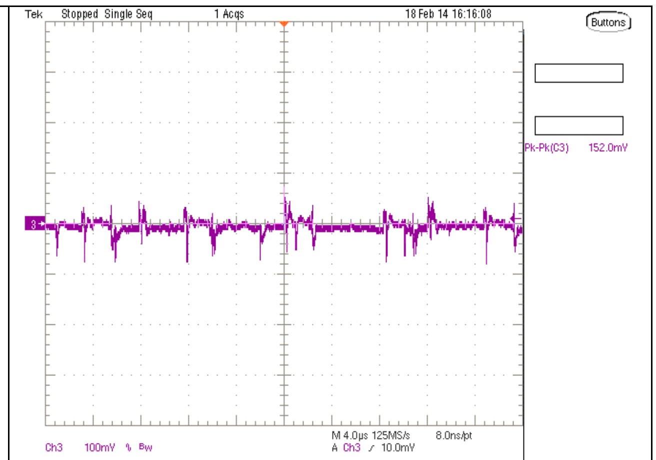
A1 PARD; I/P: 100Vac/60Hz,O/P: Min load
BW: 20MHz to High
CH3: A1 Vp-p to High



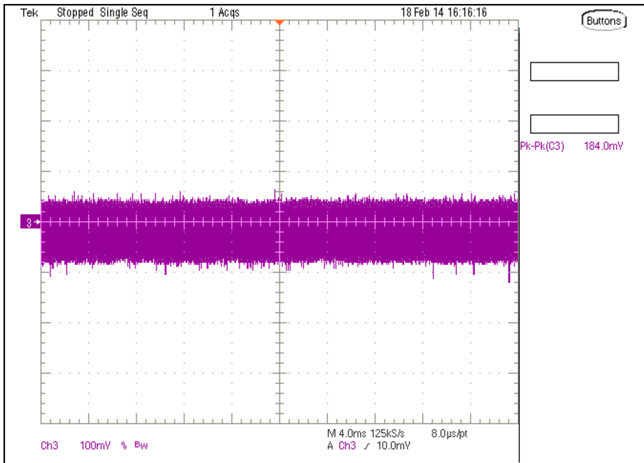
A1 PARD; I/P: 100Vac/60Hz,O/P: Min load
BW: 20MHz to High
CH3: A1 Vp-p to High



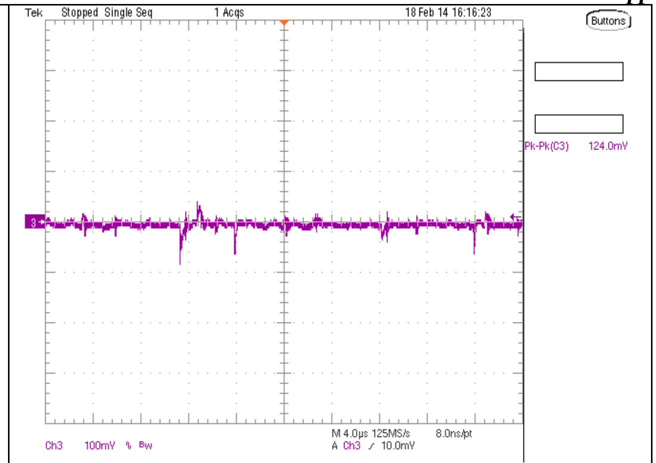
A1 PARD; I/P: 100Vac/60Hz,O/P: Max load
BW: 20MHz to High
CH3: A1 Vp-p to High



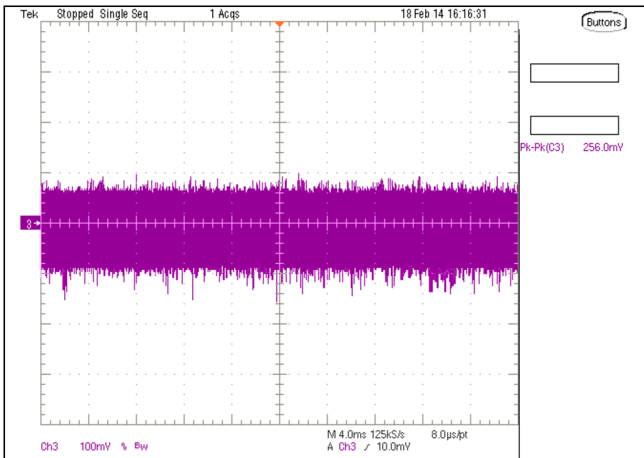
A1 PARD; I/P: 100Vac/60Hz,O/P: Max load
BW: 20MHz to High
CH3: A1 Vp-p to High



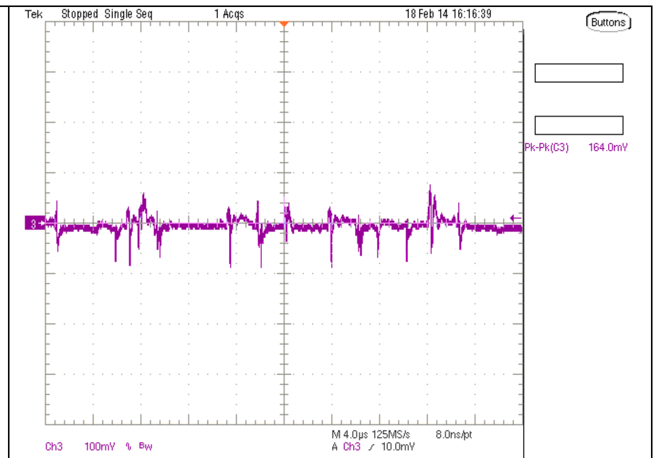
A1 PARD; I/P: 200Vac/60Hz,O/P: Min load
BW: 20MHz to High
CH3: A1 Vp-p to High



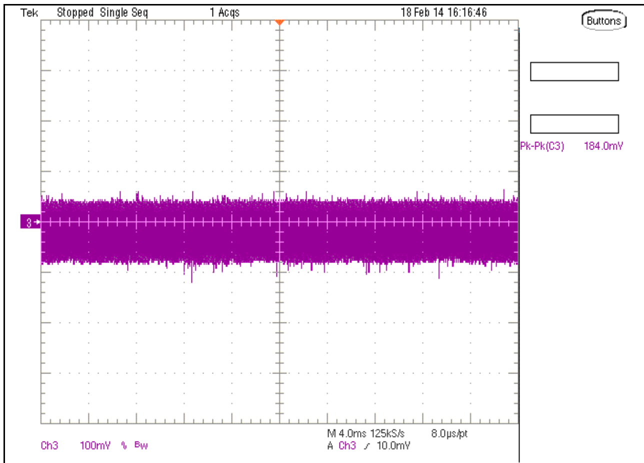
A1 PARD; I/P: 200Vac/60Hz,O/P: Min load
BW: 20MHz to High
CH3: A1 Vp-p to High



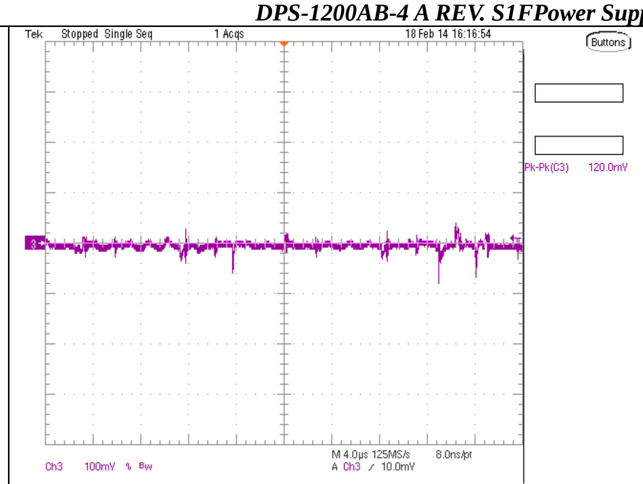
A1 PARD; I/P: 200Vac/60Hz,O/P: Max load
BW: 20MHz to High
CH3: A1 Vp-p to High



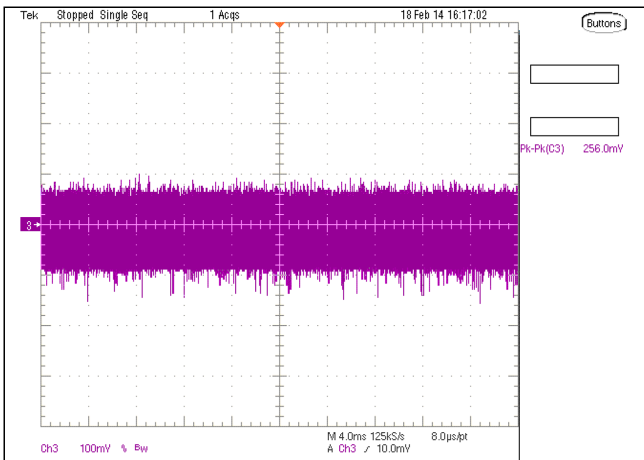
A1 PARD; I/P: 200Vac/60Hz,O/P: Max load
BW: 20MHz to High
CH3: A1 Vp-p to High



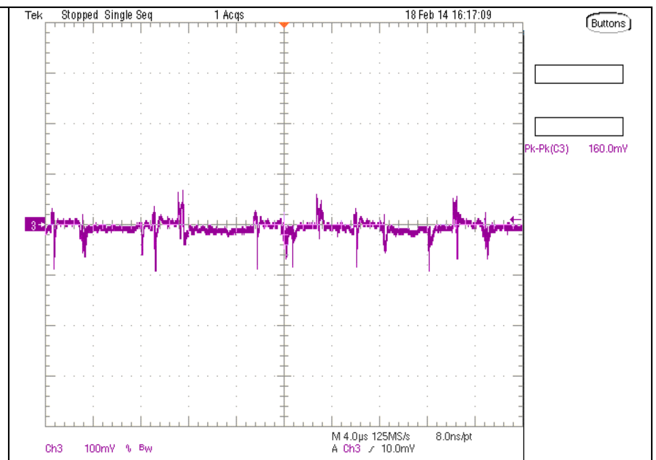
A1 PARD; I/P: 264Vac/63Hz,O/P: Min load
BW: 20MHz to High
CH3: A1 Vp-p to High



A1 PARD; I/P: 264Vac/63Hz,O/P: Min load
BW: 20MHz to High
CH3: A1 Vp-p to High

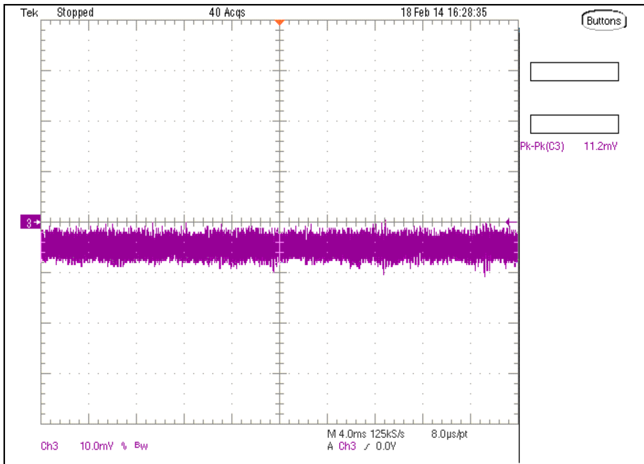


A1 PARD; I/P: 264Vac/63Hz,O/P: Max load
BW: 20MHz to High
CH3: A1 Vp-p to High

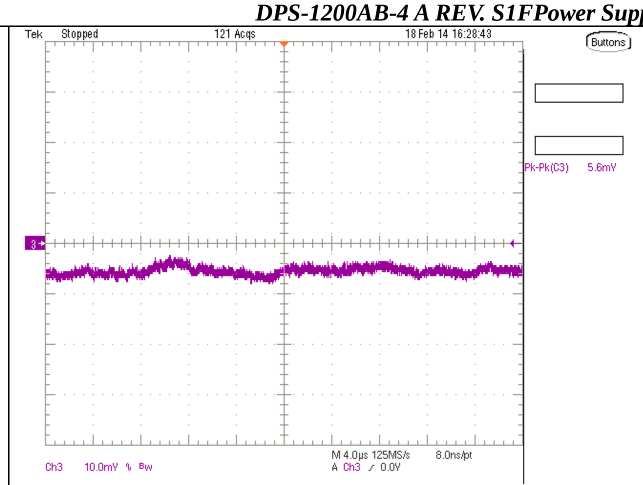


A1 PARD; I/P: 264Vac/63Hz,O/P: Max load
BW: 20MHz to High
CH3: A1 Vp-p to High

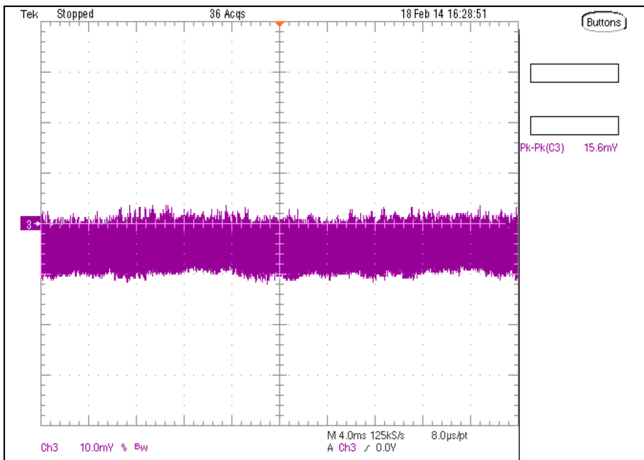
Test Condition	PARD Limit (mVp-p)	PARD Reading (mVp-p)	Result
A1 PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz to Low	*	11.2	PASS
A1 PARD; I/P: 90Vac/47Hz,O/P: Min load BW: 20MHz to Low	*	5.6	PASS
A1 PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz to Low	*	15.6	PASS
A1 PARD; I/P: 90Vac/47Hz,O/P: Max load BW: 20MHz to Low	*	10.4	PASS
A1 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to Low	*	10.8	PASS
A1 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to Low	*	5.6	PASS
A1 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to Low	*	16.0	PASS
A1 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to Low	*	10.8	PASS
A1 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to Low	*	10.8	PASS
A1 PARD; I/P: 200Vac/60Hz,O/P: Min load BW: 20MHz to Low	*	5.6	PASS
A1 PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz to Low	*	18.0	PASS
A1 PARD; I/P: 200Vac/60Hz,O/P: Max load BW: 20MHz to Low	*	12.4	PASS
A1 PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz to Low	*	10.4	PASS
A1 PARD; I/P: 264Vac/63Hz,O/P: Min load BW: 20MHz to Low	*	5.2	PASS
A1 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to Low	*	16.4	PASS
A1 PARD; I/P: 264Vac/63Hz,O/P: Max load BW: 20MHz to Low	*	11.6	PASS



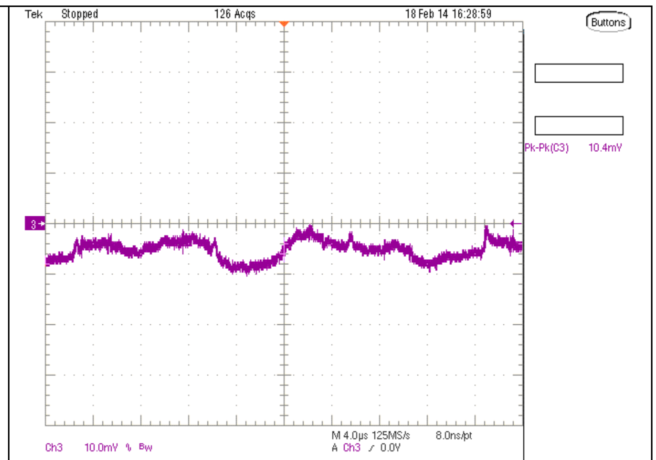
A1 PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



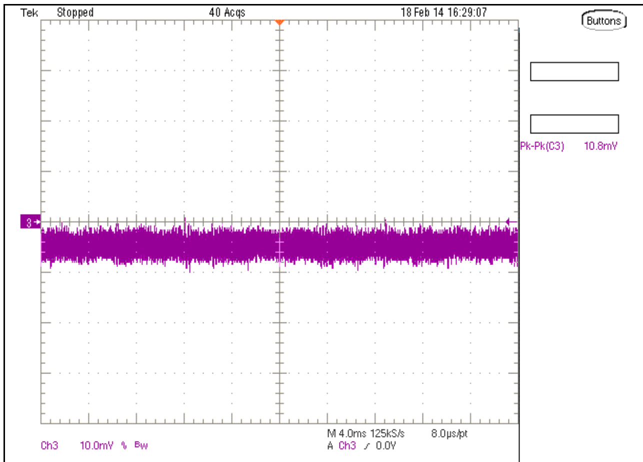
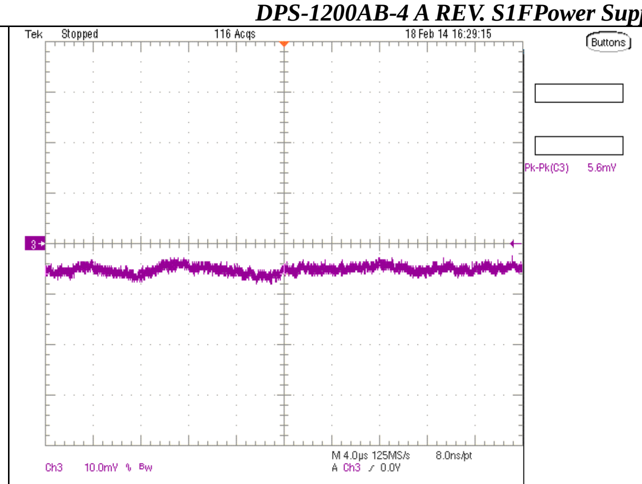
A1 PARD; I/P: 90Vac/47Hz,O/P: Min load
BW: 20MHz to Low
CH3: A1 Vp-p to Low

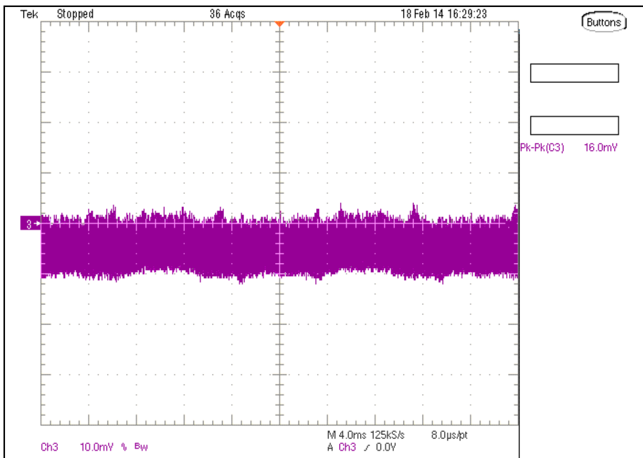
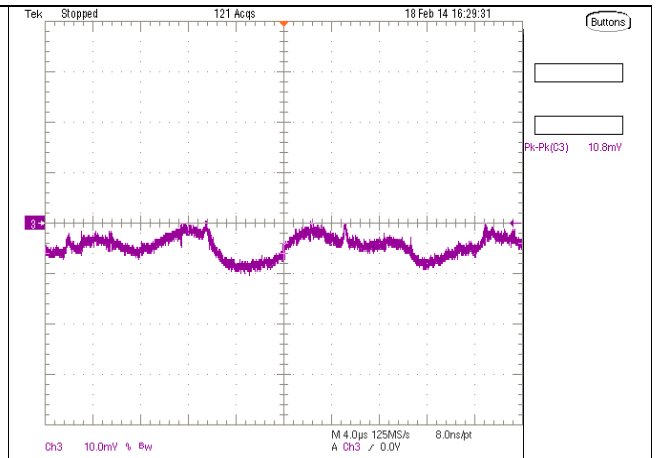


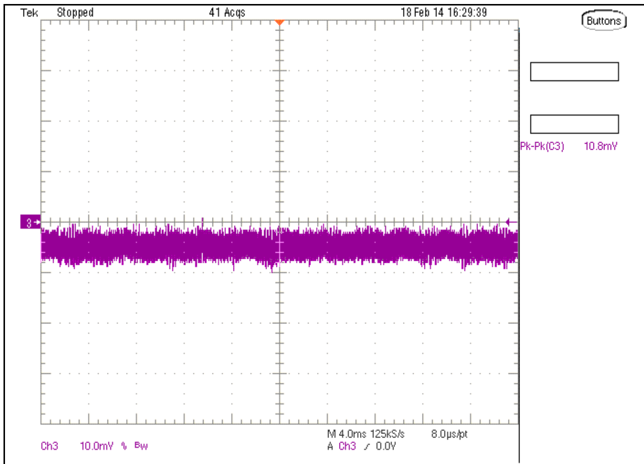
A1 PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



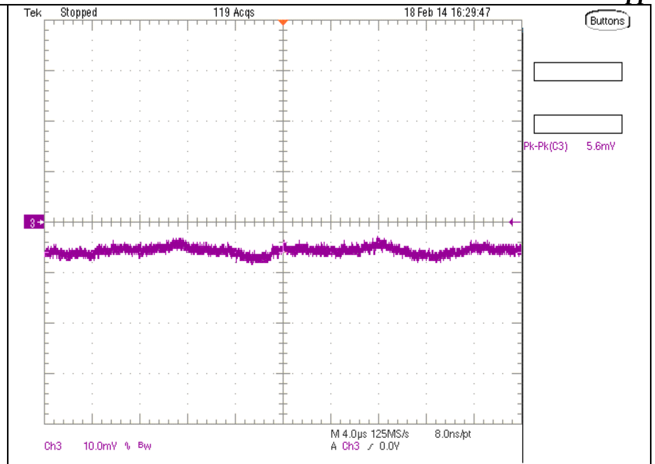
A1 PARD; I/P: 90Vac/47Hz,O/P: Max load
BW: 20MHz to Low
CH3: A1 Vp-p to Low

	
A1 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to Low CH3: A1 Vp-p to Low	A1 PARD; I/P: 100Vac/60Hz,O/P: Min load BW: 20MHz to Low CH3: A1 Vp-p to Low

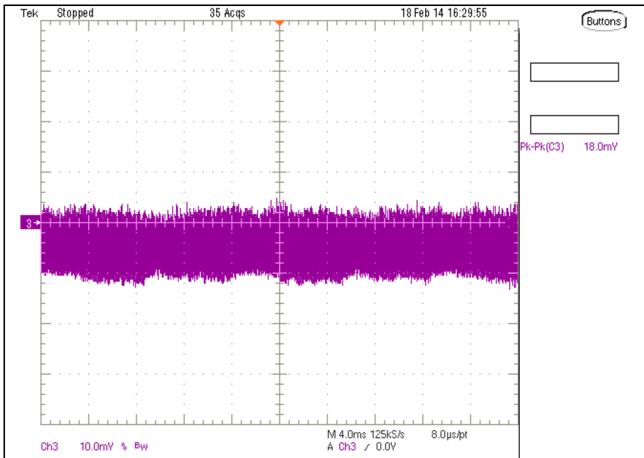
	
A1 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to Low CH3: A1 Vp-p to Low	A1 PARD; I/P: 100Vac/60Hz,O/P: Max load BW: 20MHz to Low CH3: A1 Vp-p to Low



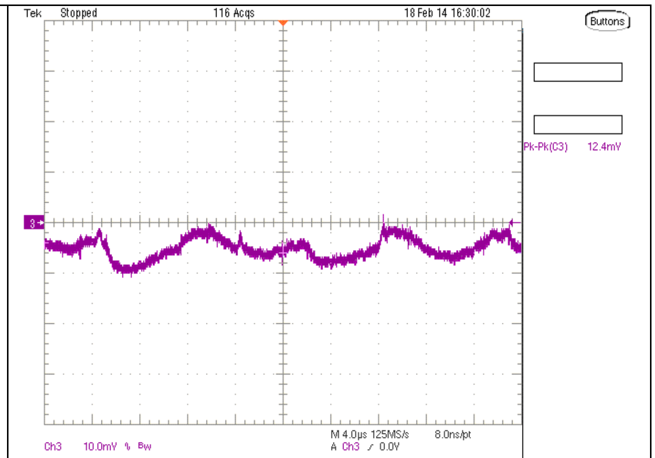
A1 PARD; I/P: 200Vac/60Hz,O/P: Min load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



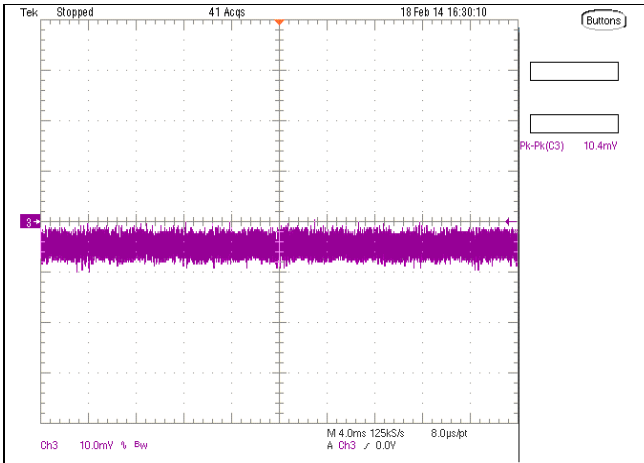
A1 PARD; I/P: 200Vac/60Hz,O/P: Min load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



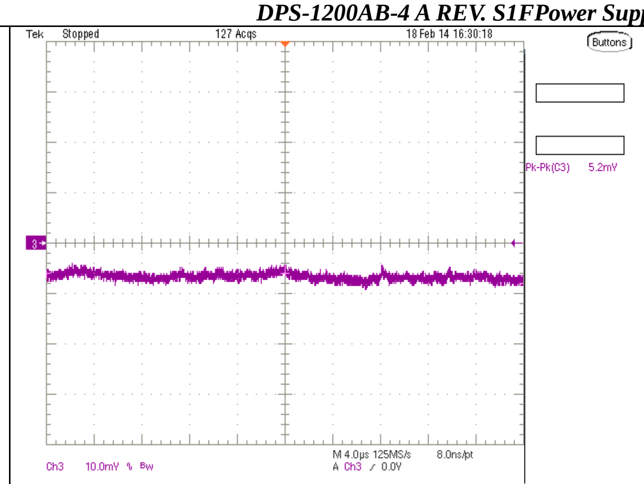
A1 PARD; I/P: 200Vac/60Hz,O/P: Max load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



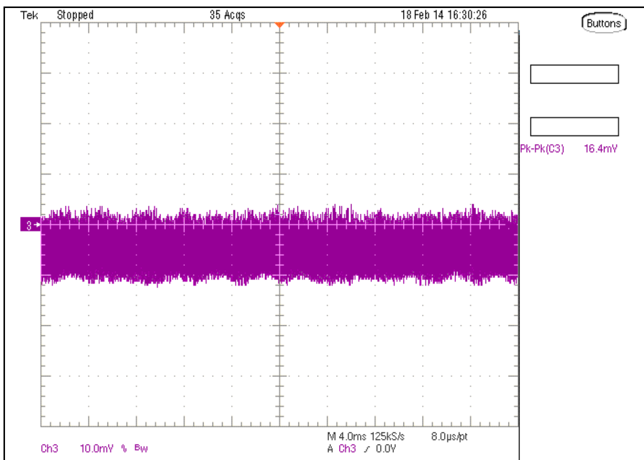
A1 PARD; I/P: 200Vac/60Hz,O/P: Max load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



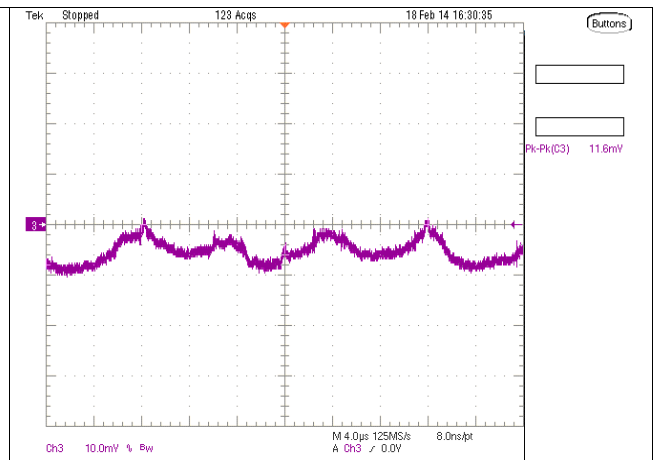
A1 PARD; I/P: 264Vac/63Hz,O/P: Min load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



A1 PARD; I/P: 264Vac/63Hz,O/P: Min load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



A1 PARD; I/P: 264Vac/63Hz,O/P: Max load
BW: 20MHz to Low
CH3: A1 Vp-p to Low



A1 PARD; I/P: 264Vac/63Hz,O/P: Max load
BW: 20MHz to Low
CH3: A1 Vp-p to Low

7. Timing

7.1 Output Voltage Timing

The timings are for single power supply operation. All outputs rise monotonically.

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7.2 Turn ON/OFF Timing (AC ON/OFF)

The turn ON/Off timing shows the timing of a single power supply being turned ON and OFF via the AC input, and PMBus ON/OFF command.

ITEM	DESCRIPTION	MIN	MAX	UNITS
$T_{sb\_on\_delay}$	Delay from AC being applied to 12VSB being within regulation.		1500	ms
T_{12Vsb_rise}	12Vsb Output voltage rise time	1	50	ms
T_{12V_rise}	12V Output voltage rise time	5	70	ms
$T_{ac\_on\_delay}$	Delay from AC being applied to all output voltages being within regulation.		2500	ms
T_{vout_holdup}	Time all output voltages stay within regulation after loss of AC (see section 3.1.8)	13*		ms
T_{pwok_holdup}	Delay from loss of AC to de-assertion of PWOK (see section 3.1.8)	12*		ms
$T_{pson\_on\_delay}$	Delay from PSON# active to output voltages within regulation limits.	5	400	ms
T_{pson_pwok}	Delay from PSON# de-active to PWOK being de-asserted.		5	ms
T_{pwok_on}	Delay from output voltages within regulation limits to PWOK asserted at turn on.	100	500	ms
T_{pwok_off}	Delay from PWOK de-asserted to 12V output voltage dropping out of regulation limits.	1		ms
~~T_{pwok_low}~~	~~Duration of PWOK being in the de-asserted state during an off/on cycle using AC or the PSON signal.~~	100		~~ms~~
T_{sb_vout}	Delay from 12Vsb being in regulation to O/Ps being in regulation at AC turn on.	5	1000	ms
T_{12VSB_holdup}	Time the 12Vsb output voltage stays within regulation after loss of AC.	70		ms

Notes*

- 12ms requirement will be applied for a full load condition.
- 10ms requirement will be applied for a half load condition.

- **Figure 1: Turn On Off Timing (AC Cycle)**

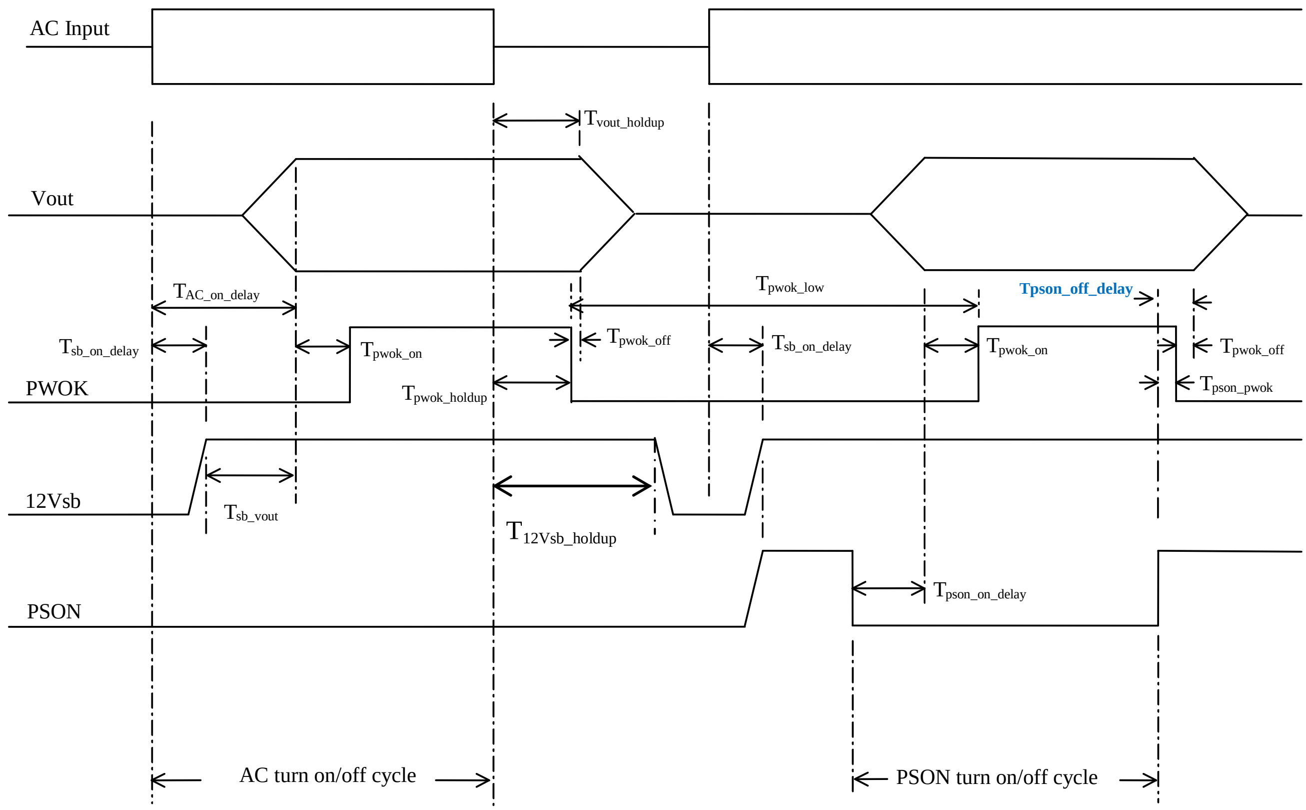


Figure 2 Turn On/Off Timing (Power Supply Signals)

7.2 Turn ON/OFF Timing (Tvout_rise)

Output voltages rise time.
T12Vsb_rise
T12V_rise
Test conditions:
Sample NO.1
Vin : 90Vac/47Hz, 264Vac/63Hz
O/P Load : Max, Min Load
AMB : 0°C, 25℃, 50°C

Numerical Result: PASS
AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	12.598	12.207	11.593
	Min	11.182	10.761	10.133
264Vac/63Hz	Max	12.567	12.173	11.559
	Min	11.134	10.691	10.092
SPEC		1ms ~ 50ms		

※ **ATS TEST**

AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	20.157	19.883	19.232
	Min	20.168	19.916	18.809
264Vac/63Hz	Max	20.115	19.872	19.211
	Min	20.153	19.916	19.210
SPEC		5ms ~ 70ms		

※ **ATS TEST**

PSON Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	20.005	19.718	19.082
	Min	19.683	19.441	19.236
264Vac/63Hz	Max	19.987	19.732	19.056
	Min	19.670	19.448	18.787
SPEC		5ms ~ 70ms		

※ **ATS TEST**

7.2 Turn ON/OFF Timing (Tvout_rise)

12V Output voltage rise time

12Vsb Output voltage rise time

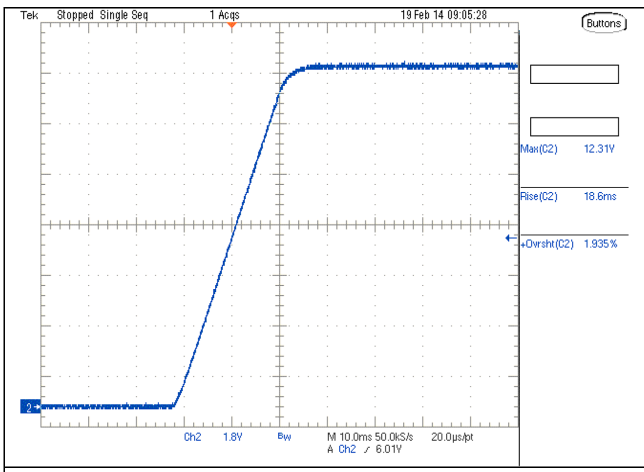
Test conditions:

Sample NO.1

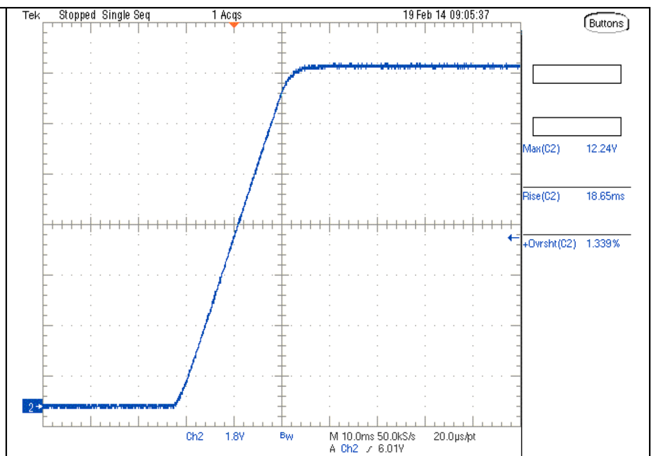
AMB. 25℃

Graphical Result: PASS

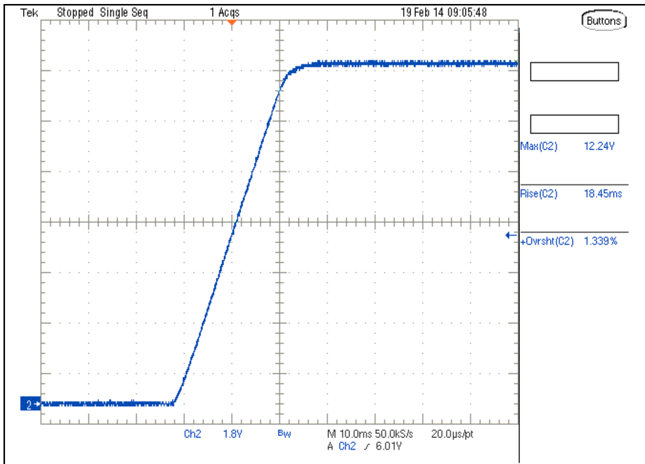
Test Condition	Rise Max (mS)	Rise Min (mS)	Rise Time (msec)	Result
+12V rise time (T3); I/P: 90Vac,O/P:Max load	5.00	70.00	18.602	PASS
+12V rise time (T3); I/P: 90Vac,O/P:Min load	5.00	70.00	18.648	PASS
+12V rise time (T3); I/P: 100Vac,O/P:Max load	5.00	70.00	18.448	PASS
+12V rise time (T3); I/P: 100Vac,O/P:Min load	5.00	70.00	18.448	PASS
+12V rise time (T3); I/P: 200Vac,O/P:Max load	5.00	70.00	18.468	PASS
+12V rise time (T3); I/P: 200Vac,O/P:Min load	5.00	70.00	18.549	PASS
+12V rise time (T3); I/P: 264Vac,O/P:Max load	5.00	70.00	18.534	PASS
+12V rise time (T3); I/P: 264Vac,O/P:Min load	5.00	70.00	18.548	PASS
+12Vsb rise time (T2); I/P: 90Vac,O/P:Max load	1.00	50.00	10.066	PASS
+12Vsb rise time (T2); I/P: 90Vac,O/P:Min load	1.00	50.00	9.871	PASS
+12Vsb rise time (T2); I/P: 100Vac,O/P:Max load	1.00	50.00	9.856	PASS
+12Vsb rise time (T2); I/P: 100Vac,O/P:Min load	1.00	50.00	9.824	PASS
+12Vsb rise time (T2); I/P: 200Vac,O/P:Max load	1.00	50.00	10.072	PASS
+12Vsb rise time (T2); I/P: 200Vac,O/P:Min load	1.00	50.00	9.864	PASS
+12Vsb rise time (T2); I/P: 264Vac,O/P:Max load	1.00	50.00	10.172	PASS
+12Vsb rise time (T2); I/P: 264Vac,O/P:Min load	1.00	50.00	9.804	PASS



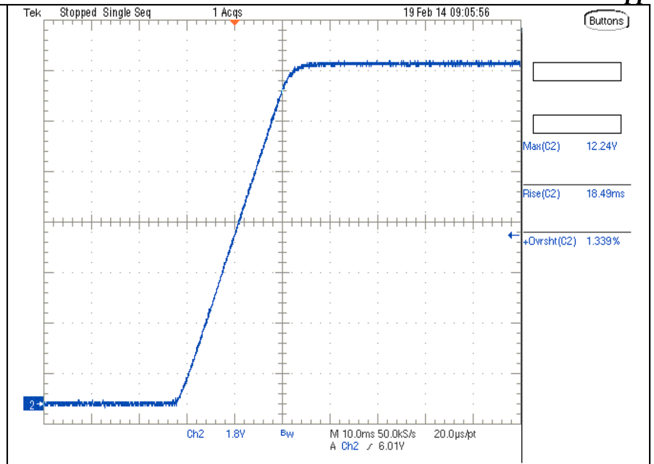
+12V rise time (T3); I/P: 90Vac,O/P:Max load
CH2: 12V



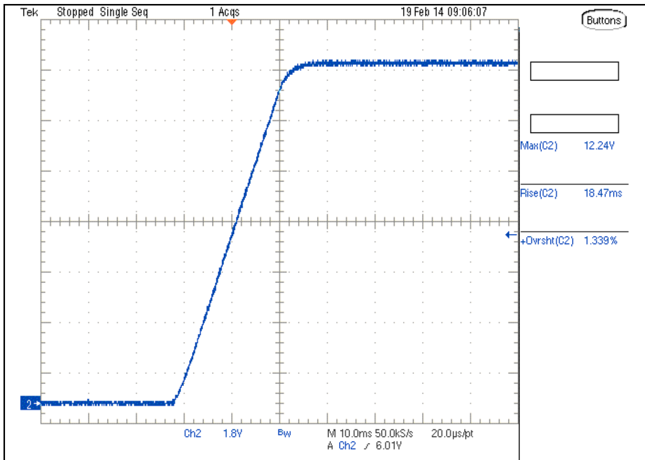
+12V rise time (T3); I/P: 90Vac,O/P:Min load
CH2: 12V



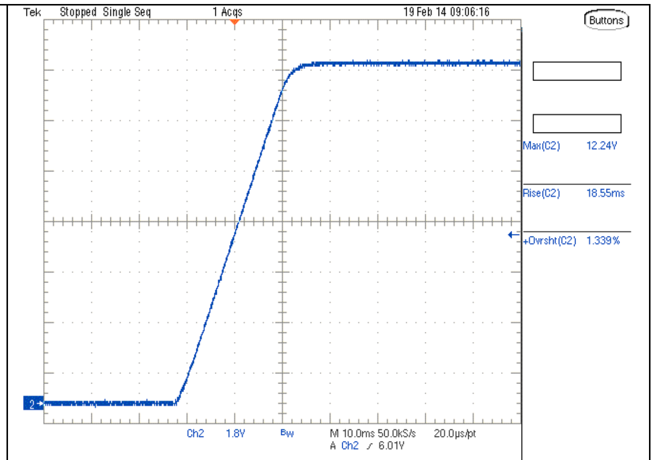
+12V rise time (T3); I/P: 100Vac,O/P:Max load
CH2: 12V



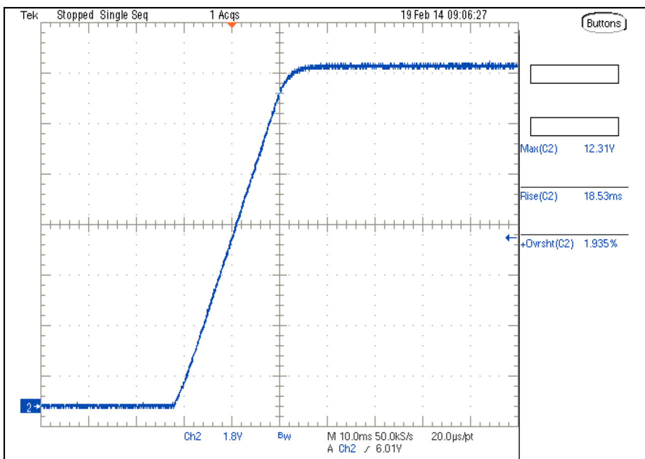
+12V rise time (T3); I/P: 100Vac,O/P:Min load
CH2: 12V



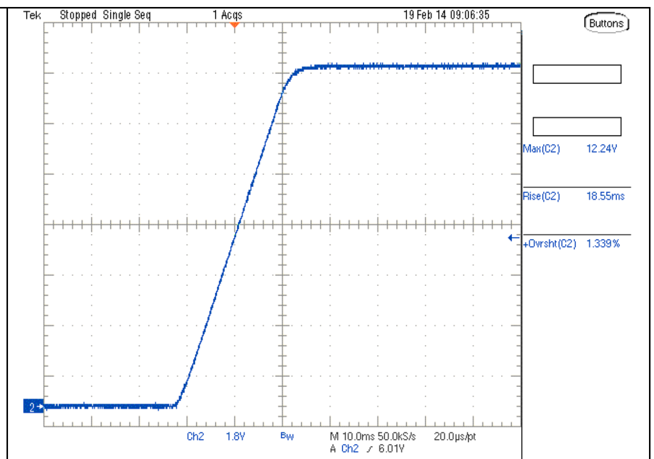
+12V rise time (T3); I/P: 200Vac,O/P:Max load
CH2: 12V



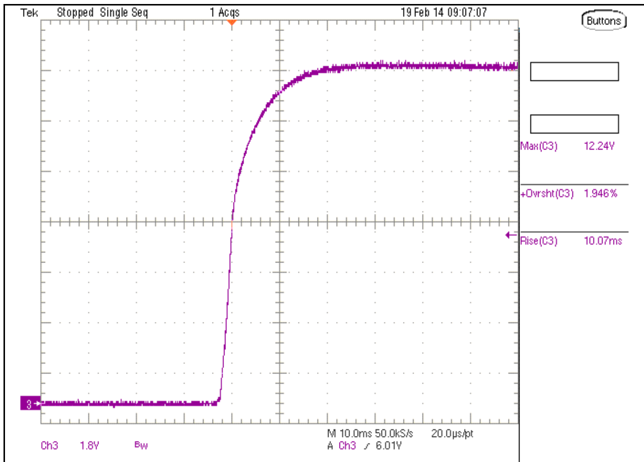
+12V rise time (T3); I/P: 200Vac,O/P:Min load
CH2: 12V



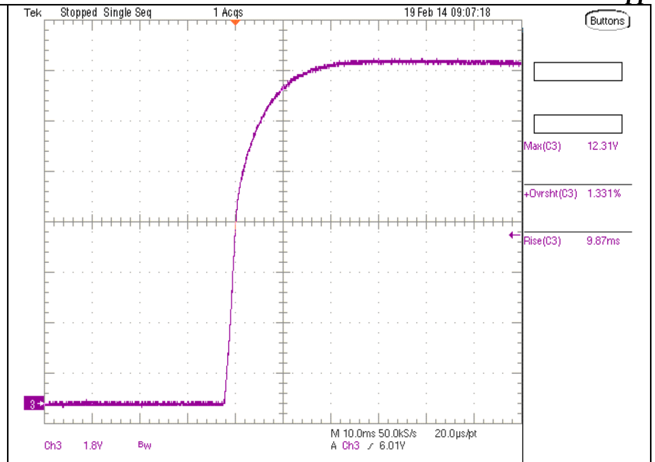
+12V rise time (T3); I/P: 264Vac,O/P:Max load
CH2: 12V



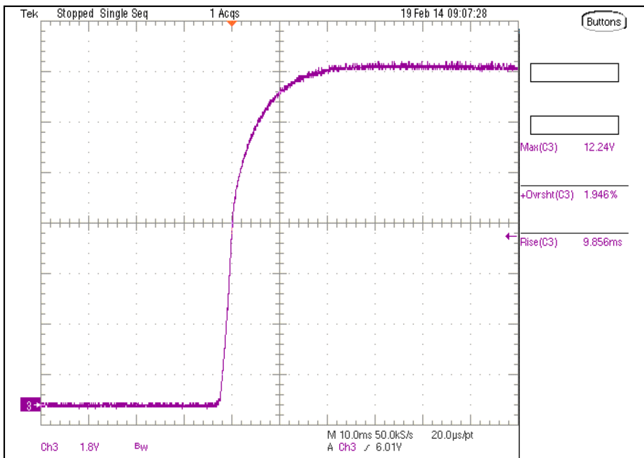
+12V rise time (T3); I/P: 264Vac,O/P:Min load
CH2: 12V



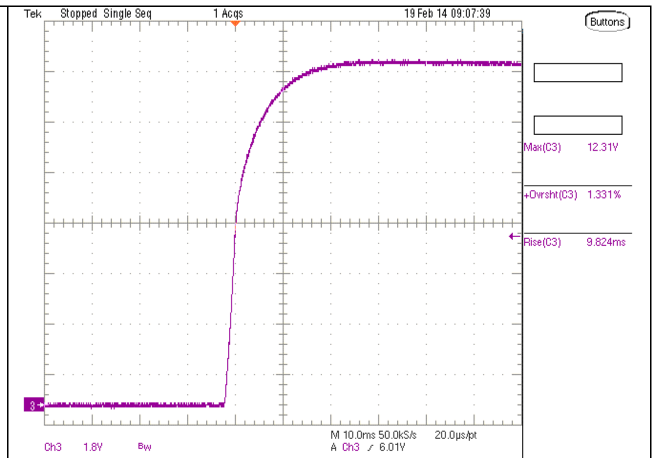
+12Vsb rise time (T2); I/P: 90Vac,O/P:Max load
CH2: 12Vsb



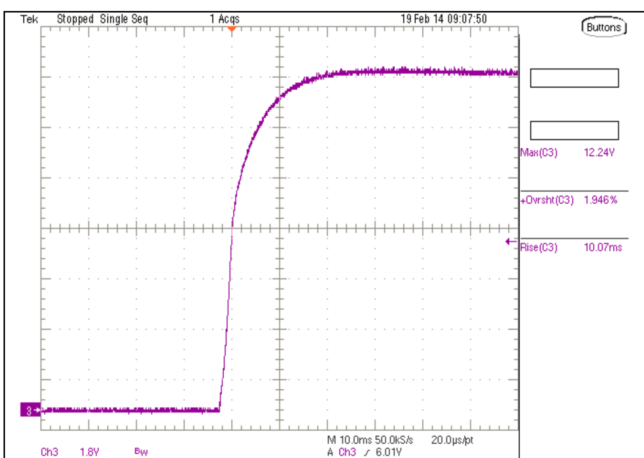
+12Vsb rise time (T2); I/P: 90Vac,O/P:Min load
CH2: 12Vsb



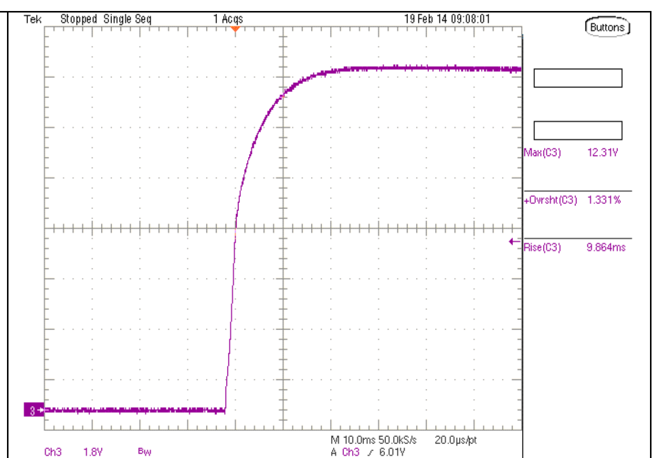
+12Vsb rise time (T2); I/P: 100Vac,O/P:Max load
CH2: 12Vsb



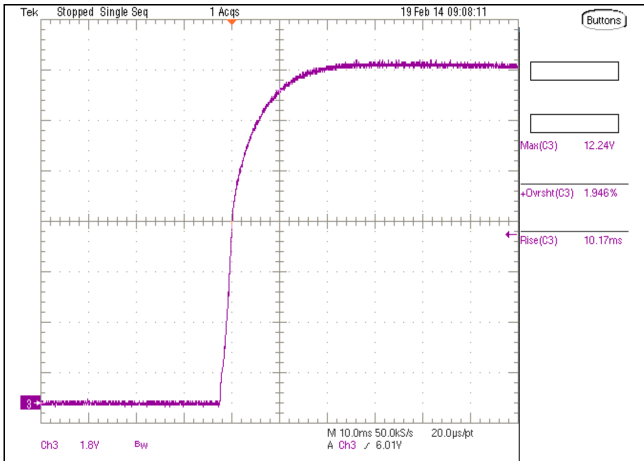
+12Vsb rise time (T2); I/P: 100Vac,O/P:Min load
CH2: 12Vsb



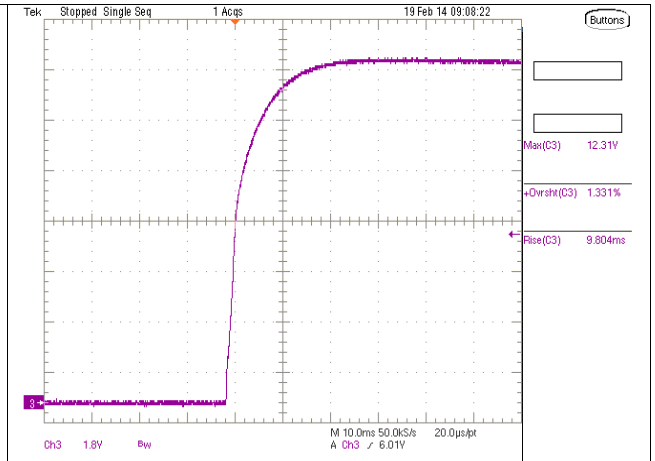
+12Vsb rise time (T2); I/P: 200Vac,O/P:Max load
CH2: 12Vsb



+12Vsb rise time (T2); I/P: 200Vac,O/P:Min load
CH2: 12Vsb



+12Vsb rise time (T2); I/P: 264Vac,O/P:Max load
CH2: 12Vsb



+12Vsb rise time (T2); I/P: 264Vac,O/P:Min load
CH2: 12Vsb

7.2 Turn ON/OFF Timing (Tsb_on_delay)

Delay from AC being applied to 12Vsb being within regulation.

Test conditions:
Sample NO.1
Vin : 90Vac/47Hz, 264Vac/63Hz
O/P Load : Max, Min Load
AMB : 0oC, 25℃, 50oC
Numerical Result: PASS
AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0^oC	25^oC	50^oC
90Vac/47Hz	Max	306.943	439.265	402.022
	Min	309.324	334.372	339.884
264Vac/63Hz	Max	200.714	229.812	206.436
	Min	197.044	210.265	187.986
SPEC		1500ms (max)		

※ ATS TEST

7.2 Turn ON/OFF Timing (Tsb_on_delay)

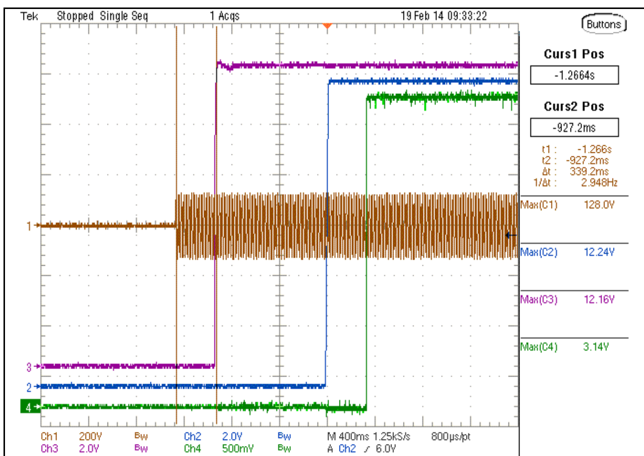
Test conditions:

Sample NO.1

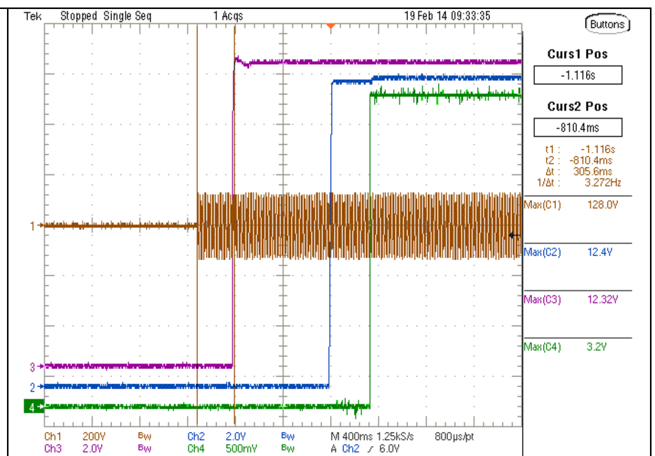
AMB. 25℃

Graphical Result: PASS

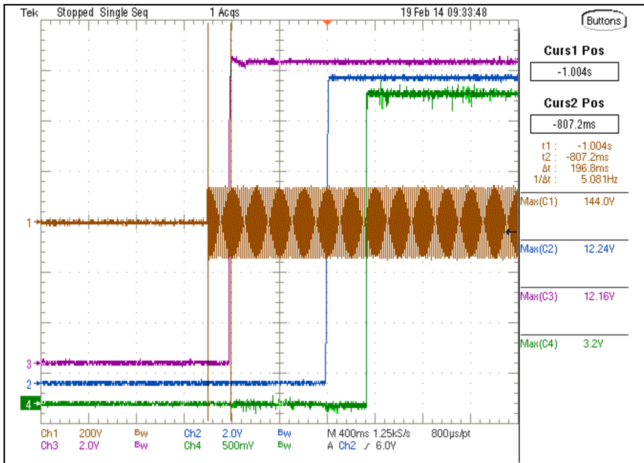
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12Vsb Start-up time (T1); I/P: 90Vac,O/P: Max load	1500.00	*	339.20	PASS
+12Vsb Start-up time (T1); I/P: 90Vac,O/P: Min load	1500.00	*	305.60	PASS
+12Vsb Start-up time (T1); I/P: 100Vac,O/P: Max load	1500.00	*	196.80	PASS
+12Vsb Start-up time (T1); I/P: 100Vac,O/P: Min load	1500.00	*	195.20	PASS
+12Vsb Start-up time (T1); I/P: 200Vac,O/P: Max load	1500.00	*	169.60	PASS
+12Vsb Start-up time (T1); I/P: 200Vac,O/P: Min load	1500.00	*	195.20	PASS
+12Vsb Start-up time (T1); I/P: 264Vac,O/P: Max load	1500.00	*	190.40	PASS
+12Vsb Start-up time (T1); I/P: 264Vac,O/P: Min load	1500.00	*	193.60	PASS



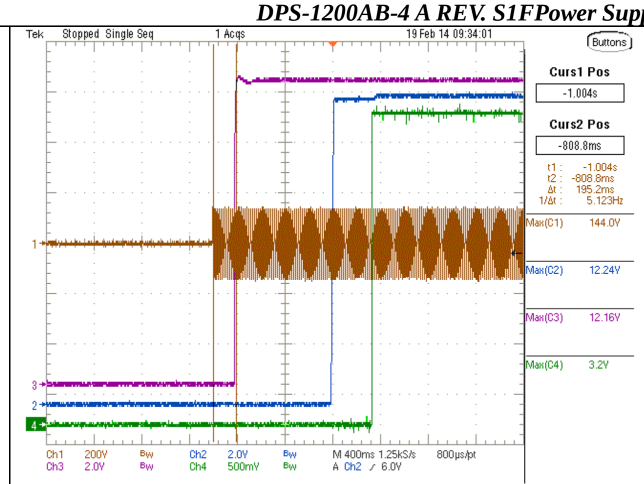
+12Vsb Start-up time (T1); I/P: 90Vac,O/P: Max load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



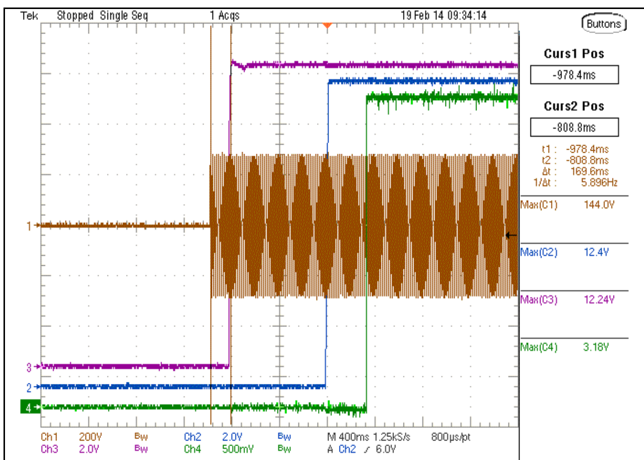
+12Vsb Start-up time (T1); I/P: 90Vac,O/P: Min load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



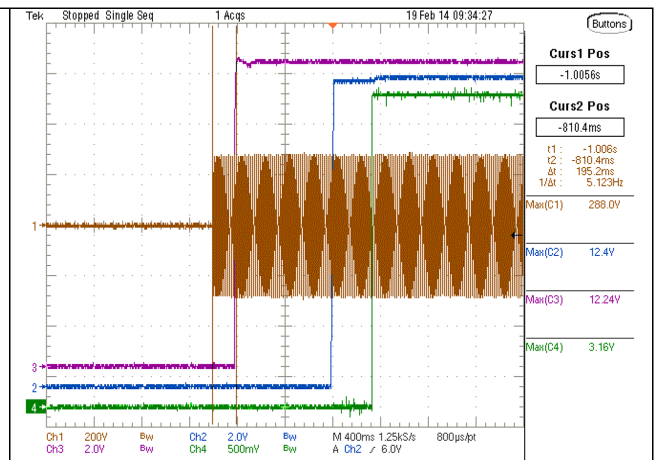
+12Vsb Start-up time (T1); I/P: 100Vac,O/P: Max load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Start-up time (T1); I/P: 100Vac,O/P: Min load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Start-up time (T1); I/P: 200Vac,O/P: Max load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Start-up time (T1); I/P: 200Vac,O/P: Min load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

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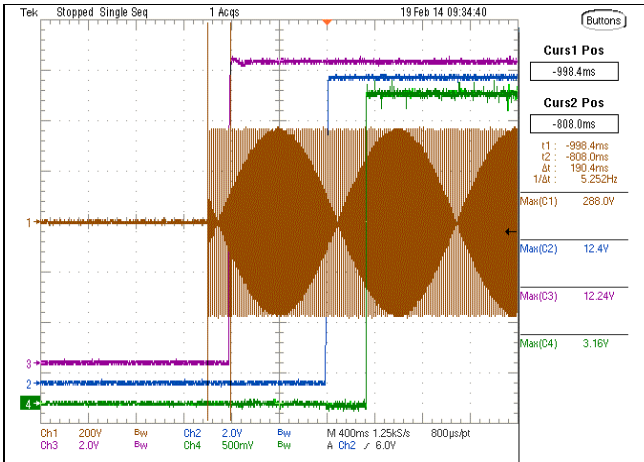
<td>
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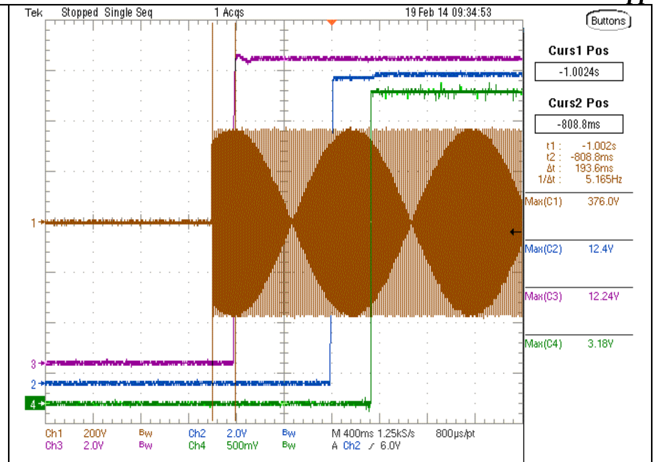
<td>
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<tr>
<td>+12Vsb Start-up time (T1); I/P: 264Vac,O/P: Max load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
<td>+12Vsb Start-up time (T1); I/P: 264Vac,O/P: Min load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
</tr>
</table>

7.2 Turn ON/OFF Timing (Tac_on_delay)

Delay from AC being applied to all output voltage being within regulation.

Test conditions:
Sample NO.1
Vin : 90Vac/47Hz, 264Vac/63Hz
O/P Load : Max, Min Load
AMB : 0°C, 25℃, 50°C

Numerical Result: PASS

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	1217.282	1345.120	1305.526
	Min	1139.490	1159.780	1164.420
264Vac/63Hz	Max	1029.918	1053.645	1029.860
	Min	1027.272	1035.194	1012.314
SPEC		2500ms (max)		

※ATS TEST

7.2 Turn ON/OFF Timing (Tac_on_delay)

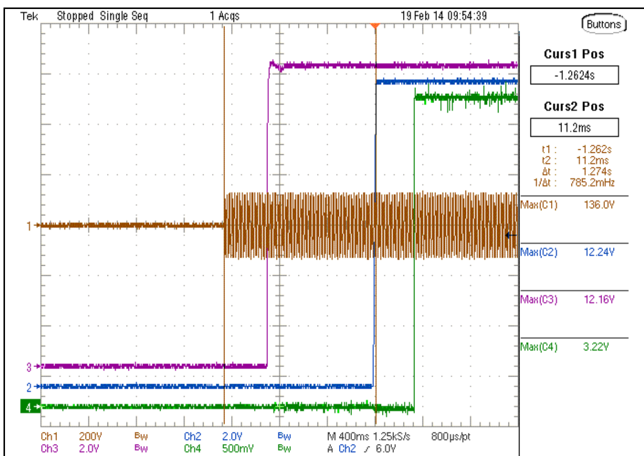
Test conditions:

Sample NO.1

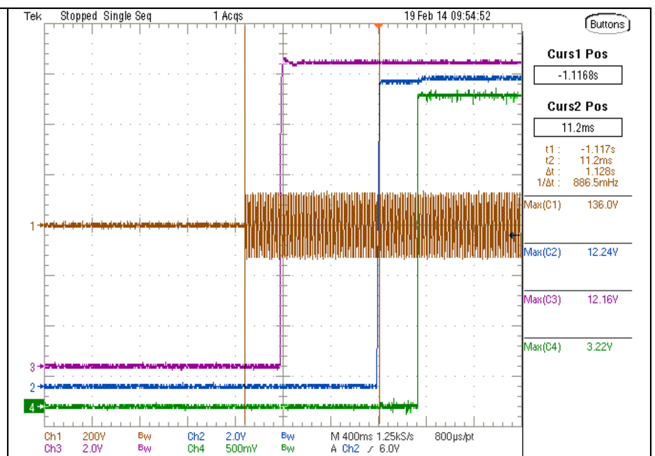
AMB. 25℃

Graphical Result: PASS

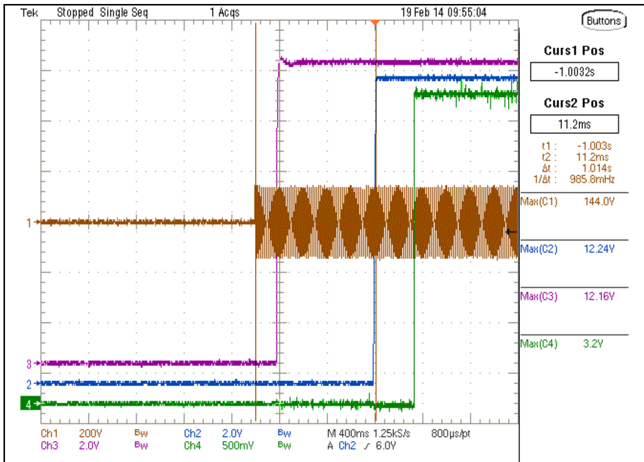
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12V Start-up time (T4); I/P: 90Vac,O/P:Max load	2500.00	*	1273.60	PASS
+12V Start-up time (T4); I/P: 90Vac,O/P:Min load	2500.00	*	1128.00	PASS
+12V Start-up time (T4); I/P: 100Vac,O/P:Max load	2500.00	*	1014.40	PASS
+12V Start-up time (T4); I/P: 100Vac,O/P:Min load	2500.00	*	1015.20	PASS
+12V Start-up time (T4); I/P: 200Vac,O/P:Max load	2500.00	*	999.20	PASS
+12V Start-up time (T4); I/P: 200Vac,O/P:Min load	2500.00	*	1019.20	PASS
+12V Start-up time (T4); I/P: 264Vac,O/P:Max load	2500.00	*	1016.80	PASS
+12V Start-up time (T4); I/P: 264Vac,O/P:Min load	2500.00	*	1024.80	PASS



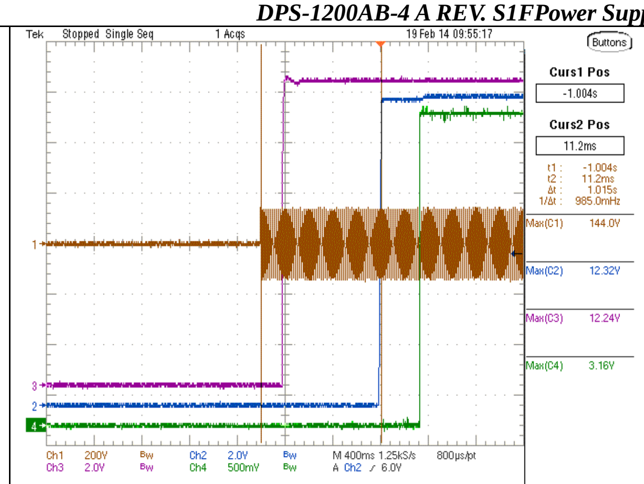
+12V Start-up time (T4); I/P: 90Vac,O/P:Max load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



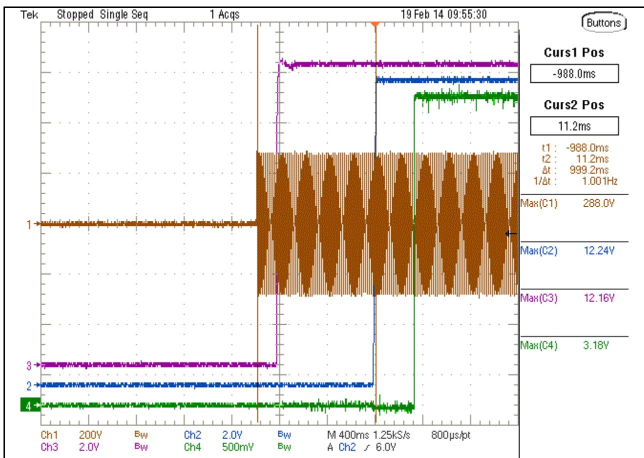
+12V Start-up time (T4); I/P: 90Vac,O/P:Min load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



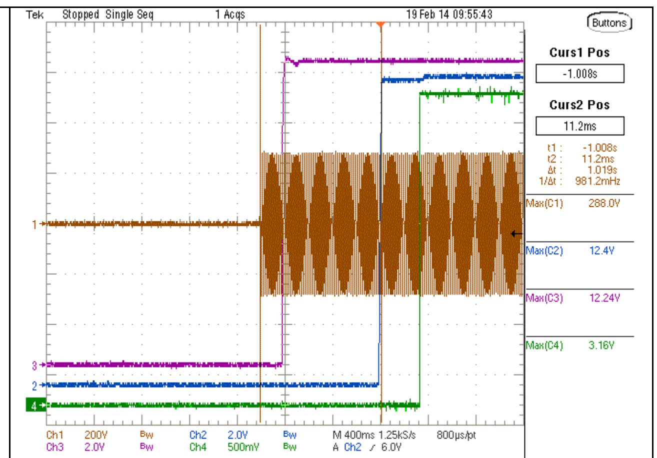
+12V Start-up time (T4); I/P: 100Vac,O/P:Max load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



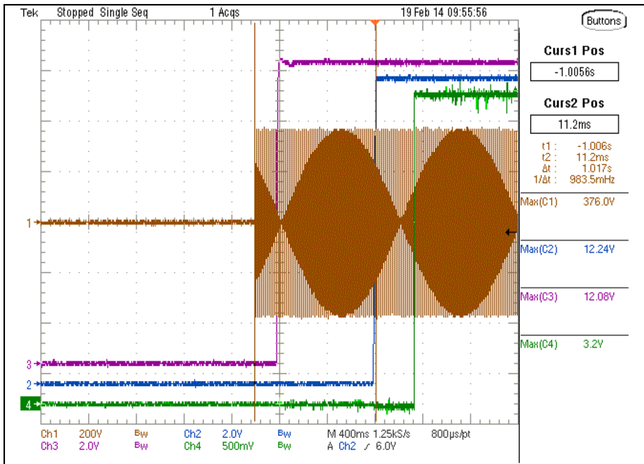
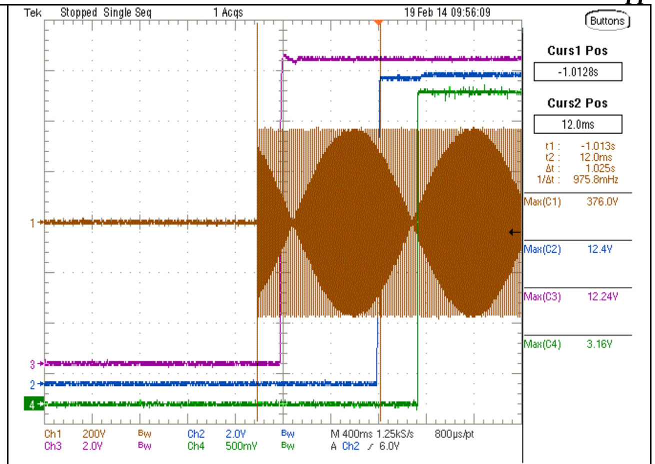
+12V Start-up time (T4); I/P: 100Vac,O/P:Min load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12V Start-up time (T4); I/P: 200Vac,O/P:Max load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12V Start-up time (T4); I/P: 200Vac,O/P:Min load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

	
+12V Start-up time (T4); I/P: 264Vac,O/P:Max load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	+12V Start-up time (T4); I/P: 264Vac,O/P:Min load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

7.2 Turn ON/OFF Timing (Tpwok_on)

Delay from output voltage within regulation limits to PWOK asserted at turn.

Test conditions:

Sample NO.1

Vin : 90Vac/47Hz, 264Vac/63Hz

O/P Load : Max, Min Load

AMB : 0°C, 25℃, 50°C

Numerical Result: PASS

AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	322.150	322.636	323.509
	Min	322.233	322.601	323.554
264Vac/63Hz	Max	322.222	322.604	323.565
	Min	322.263	322.643	323.616
SPEC		100ms ~ 500ms		

※ **ATS TEST**

PSON Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	322.328	322.695	323.676
	Min	322.719	323.081	324.008
264Vac/63Hz	Max	322.320	322.775	323.760
	Min	322.691	323.096	324.045
SPEC		100ms ~ 500ms		

※ **ATS TEST**

7.2 Turn ON/OFF Timing (Tpwok_on)

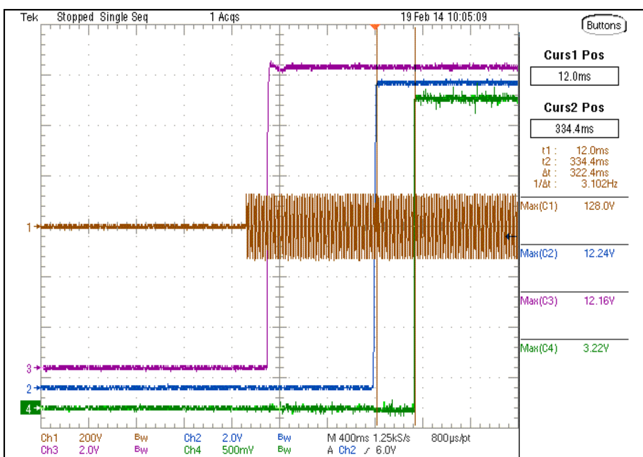
Test conditions:

Sample NO.1

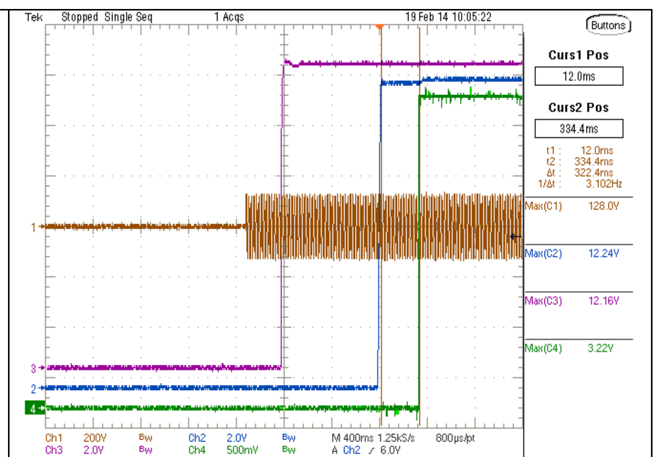
AMB. 25℃

Graphical Result: PASS

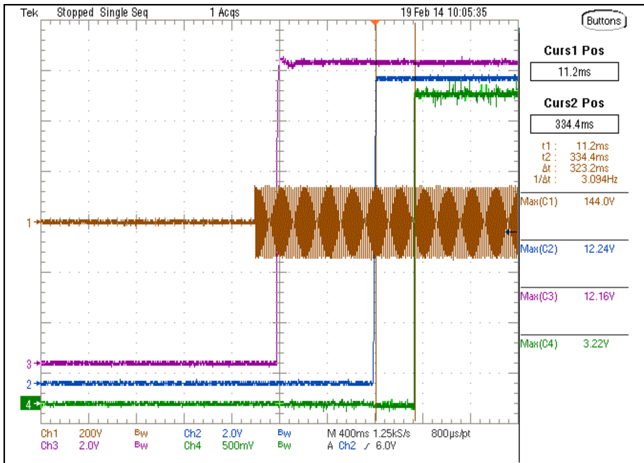
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
Start-up time (T9); I/P: 90Vac,O/P:Max load for PWOK	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 90Vac,O/P:Min load for PWOK	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 100Vac,O/P:Max load for PWOK	500.00	100.00	323.20	PASS
Start-up time (T9); I/P: 100Vac,O/P:Min load for PWOK	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 200Vac,O/P:Max load for PWOK	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 200Vac,O/P:Min load for PWOK	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 264Vac,O/P:Max load for PWOK	500.00	100.00	322.40	PASS
Start-up time (T9); I/P: 264Vac,O/P:Min load for PWOK	500.00	100.00	322.40	PASS



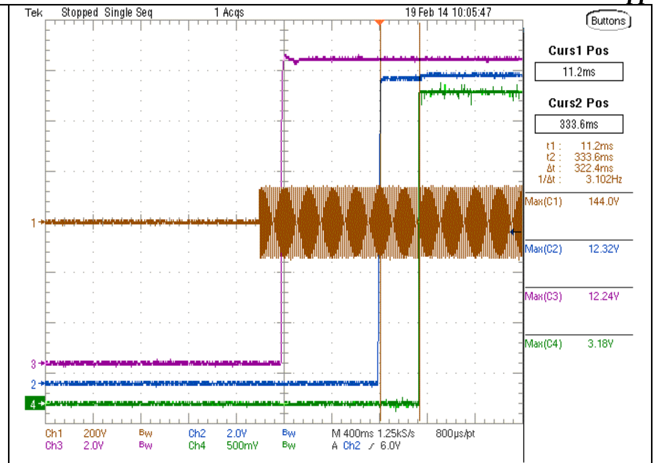
Start-up time (T9); I/P: 90Vac,O/P:Max load for PWOK
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



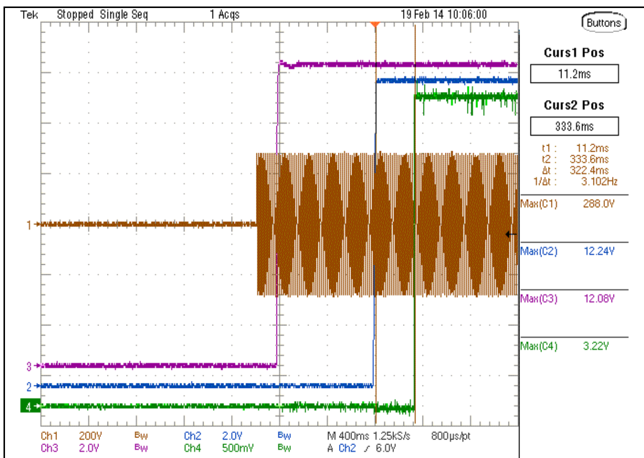
Start-up time (T9); I/P: 90Vac,O/P:Min load for PWOK
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



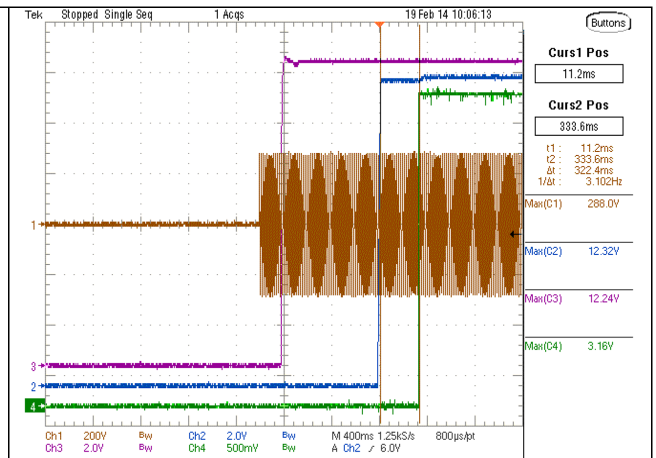
Start-up time (T9); I/P: 100Vac,O/P:Max load for PWOK
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Start-up time (T9); I/P: 100Vac,O/P:Min load for PWOK
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Start-up time (T9); I/P: 200Vac,O/P:Max load for PWOK
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Start-up time (T9); I/P: 200Vac,O/P:Min load for PWOK
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

7.2 Turn ON/OFF Timing (Tsb_vout)

Delay from 12Vsb being in regulation to output voltages being in regulation at AC turn on.

Test conditions:

Sample NO.1

Vin : 90Vac/47Hz, 264Vac/63Hz

O/P Load : Max, Min Load

AMB : 0^{o}C, 25℃, 50^{o}C

Numerical Result: PASS

AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0^{o}C	25^{o}C	50^{o}C
90Vac/47Hz	Max	910.374	905.891	903.542
	Min	830.198	825.440	824.572
264Vac/63Hz	Max	829.236	823.865	823.458
	Min	830.261	824.959	824.359
SPEC		5ms ~1000ms		

※ **ATS TEST**

7.2 Turn ON/OFF Timing (Tsb_vout)

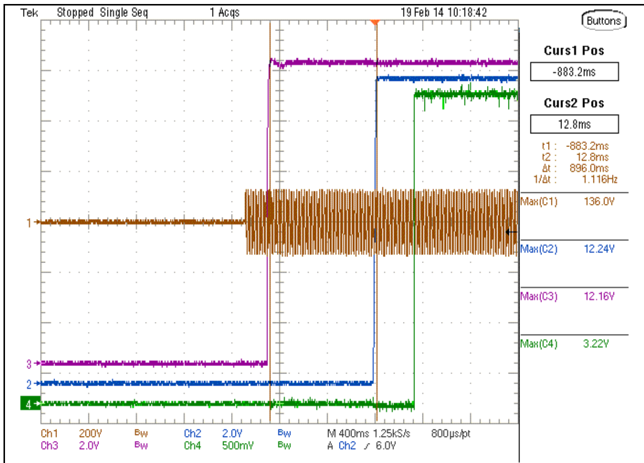
Test conditions:

Sample NO.1

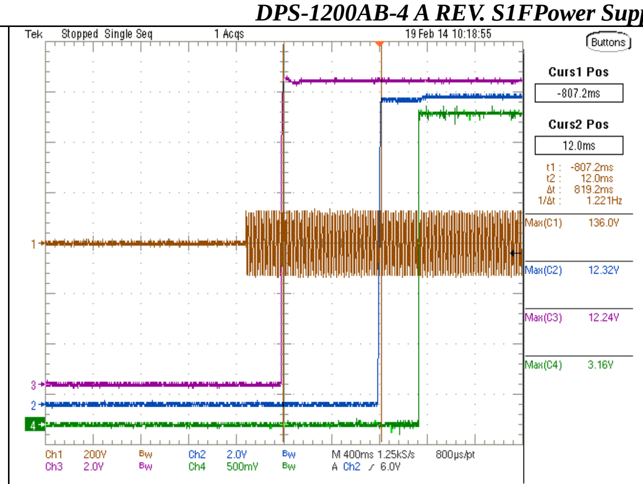
AMB. 25℃

Graphical Result: PASS

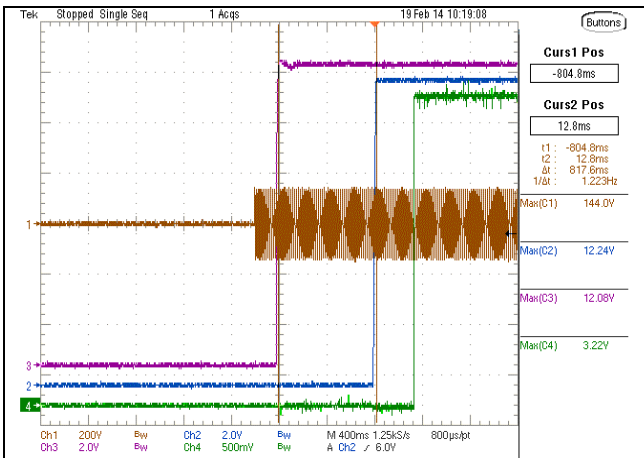
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
Start-up time (T12); I/P: 90Vac,O/P:Max load for 12V vs 12Vsb	1000.00	5.00	896.00	PASS
Start-up time (T12); I/P: 90Vac,O/P:Min load for 12V vs 12Vsb	1000.00	5.00	819.20	PASS
Start-up time (T12); I/P: 100Vac,O/P:Max load for 12V vs 12Vsb	1000.00	5.00	817.60	PASS
Start-up time (T12); I/P: 100Vac,O/P:Min load for 12V vs 12Vsb	1000.00	5.00	818.40	PASS
Start-up time (T12); I/P: 200Vac,O/P:Max load for 12V vs 12Vsb	1000.00	5.00	816.80	PASS
Start-up time (T12); I/P: 200Vac,O/P:Min load for 12V vs 12Vsb	1000.00	5.00	817.60	PASS
Start-up time (T12); I/P: 264Vac,O/P:Max load for 12V vs 12Vsb	1000.00	5.00	819.20	PASS
Start-up time (T12); I/P: 264Vac,O/P:Min load for 12V vs 12Vsb	1000.00	5.00	818.40	PASS



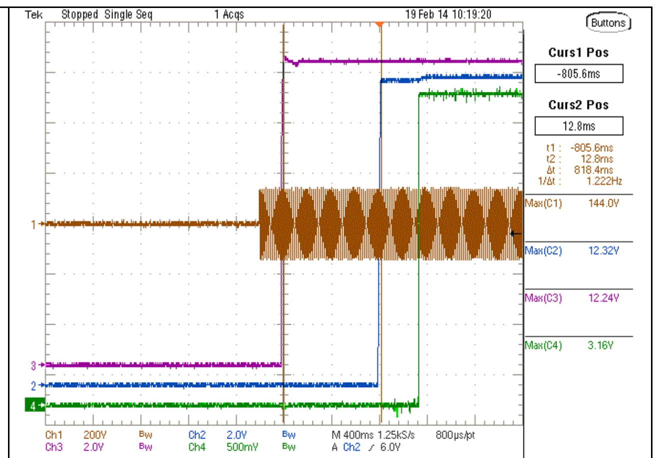
Start-up time (T12); I/P: 90Vac,O/P:Max load for 12V vs 12Vsb
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



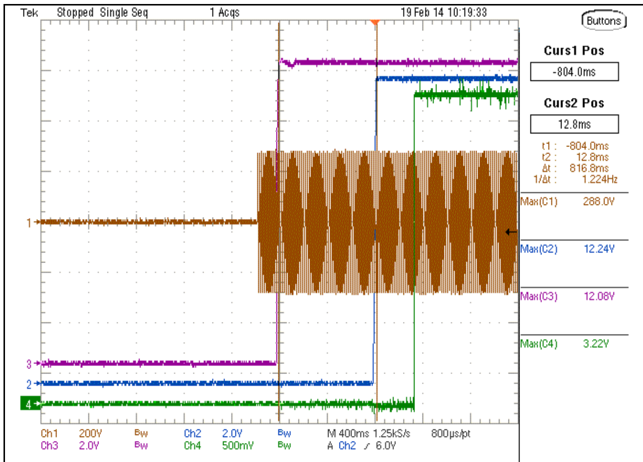
Start-up time (T12); I/P: 90Vac,O/P:Min load for 12V vs 12Vsb
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



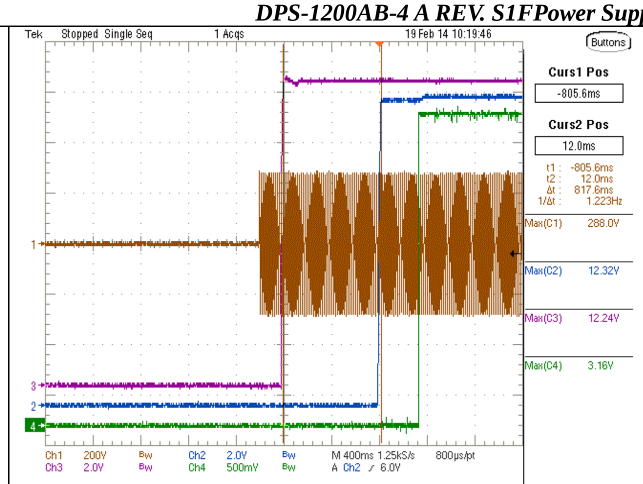
Start-up time (T12); I/P: 100Vac,O/P:Max load for 12V vs 12Vsb
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



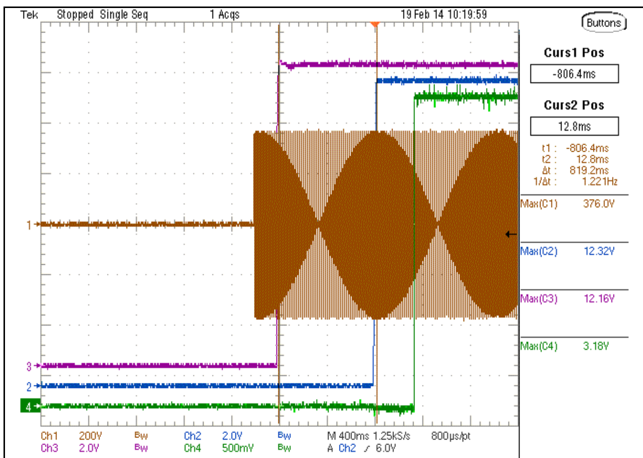
Start-up time (T12); I/P: 100Vac,O/P:Min load for 12V vs 12Vsb
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



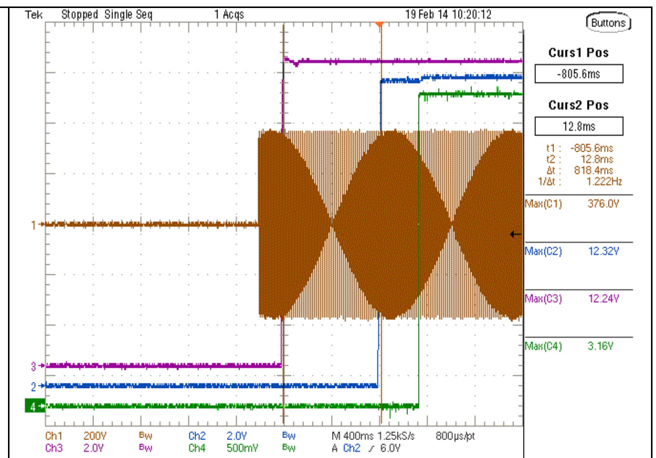
Start-up time (T12); I/P: 200Vac,O/P:Max load for 12V vs 12Vsb
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Start-up time (T12); I/P: 200Vac,O/P:Min load for 12V vs 12Vsb
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Start-up time (T12); I/P: 264Vac,O/P:Max load for 12V vs 12Vsb
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Start-up time (T12); I/P: 264Vac,O/P:Min load for 12V vs 12Vsb
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

7.2 Turn ON/OFF Timing (Tpwok_holdup)

Delay from loss of AC to de-assertion of PWOK.

Test conditions:
Sample NO.1
Vin : 90Vac/47Hz, 264Vac/63Hz
O/P Load : Max, Half Load
AMB : 0°C, 25℃, 50°C

Numerical Result: PASS

AC Turn on/off cycle

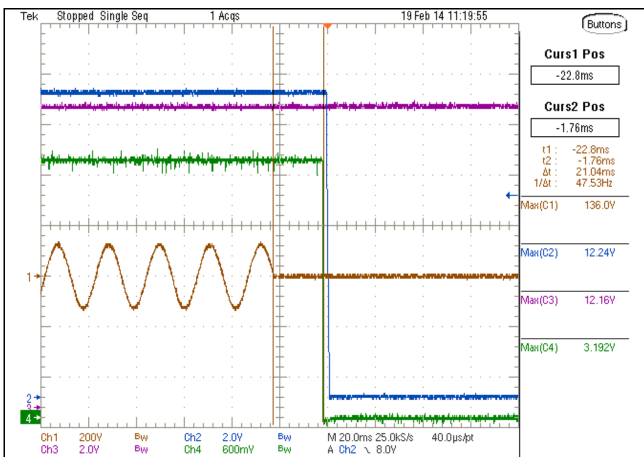
AC Condition	O/P Load	Timing Reading (mS)			SPEC (min)
		0°C	25°C	50°C	
90Vac/47Hz	Max	19.509	20.252	20.948	12ms
	Half	32.198	32.327	32.440	10ms
264Vac/63Hz	Max	16.606	16.924	17.397	12ms
	Half	28.501	29.507	29.931	10ms

※ **ATS TEST**

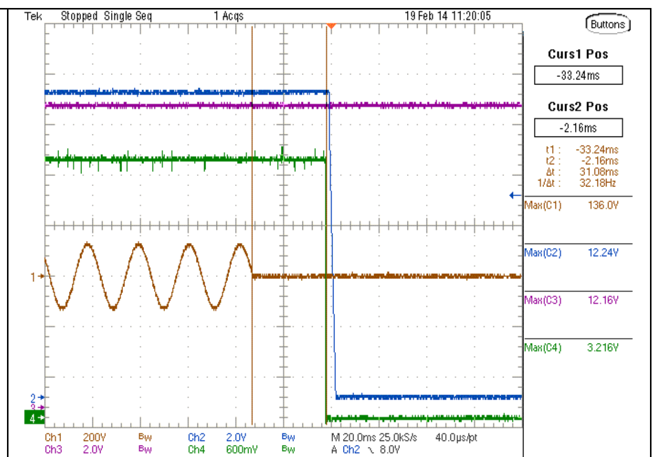
7.2 Turn ON/OFF Timing (Tpwok_holdup)

Test conditions:
Sample NO.1
AMB. 25℃
Graphical Result: PASS

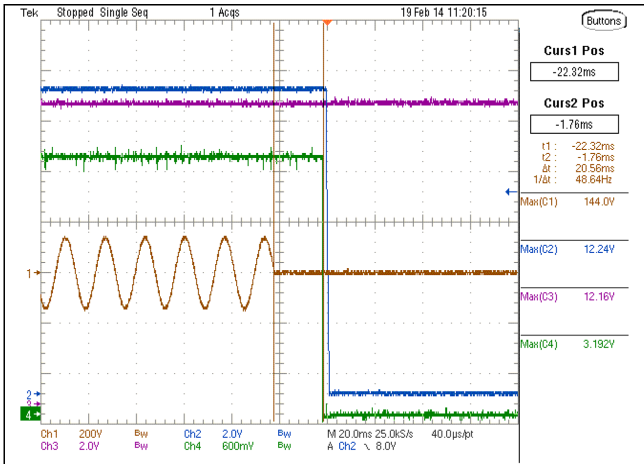
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12Vsb Hold up time (T6); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Max Load	*	12.00	21.04	PASS
+12Vsb Hold up time (T6); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:50% Load	*	10.00	31.08	PASS
+12Vsb Hold up time (T6); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Max Load	*	12.00	20.56	PASS
+12Vsb Hold up time (T6); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:50% Load	*	10.00	31.04	PASS
+12Vsb Hold up time (T6); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Max Load	*	12.00	17.44	PASS
+12Vsb Hold up time (T6); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:50% Load	*	10.00	14.16	PASS
+12Vsb Hold up time (T6); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Max Load	*	12.00	20.56	PASS
+12Vsb Hold up time (T6); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:50% Load	*	10.00	26.32	PASS



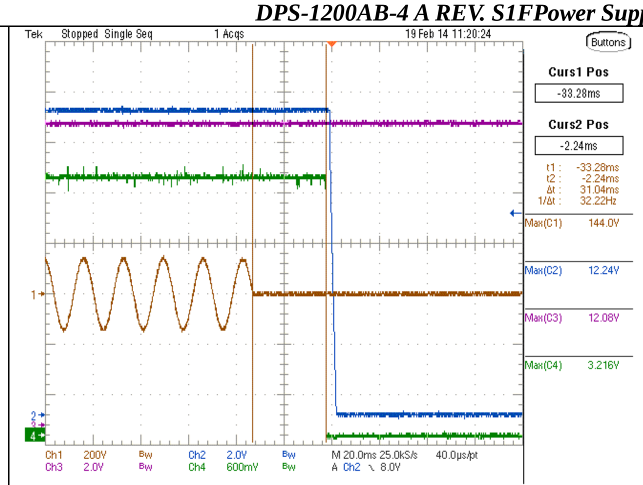
+12Vsb Hold up time (T6); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



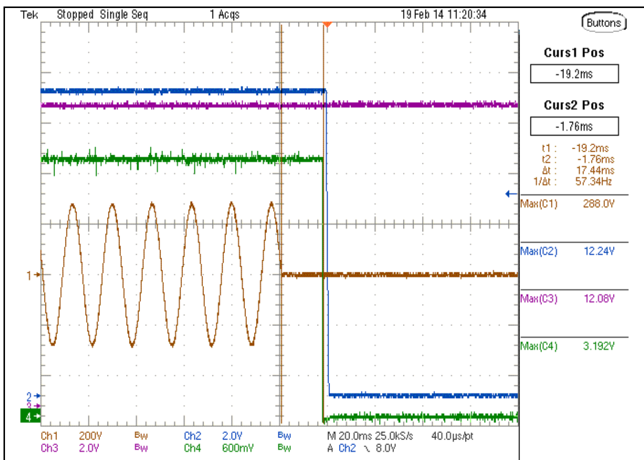
+12Vsb Hold up time (T6); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:50% Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



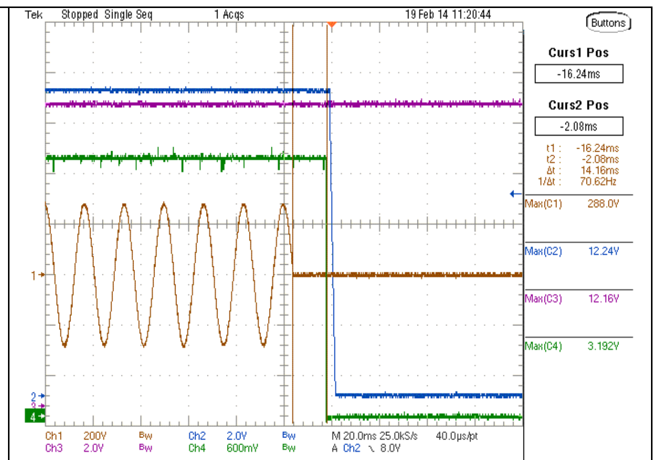
+12Vsb Hold up time (T6); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



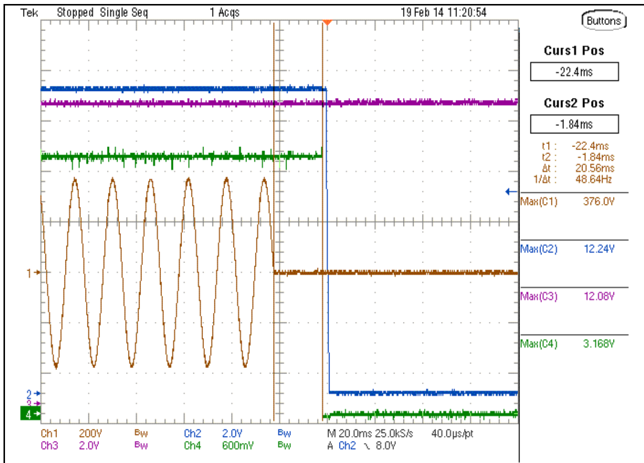
+12Vsb Hold up time (T6); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:50% Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



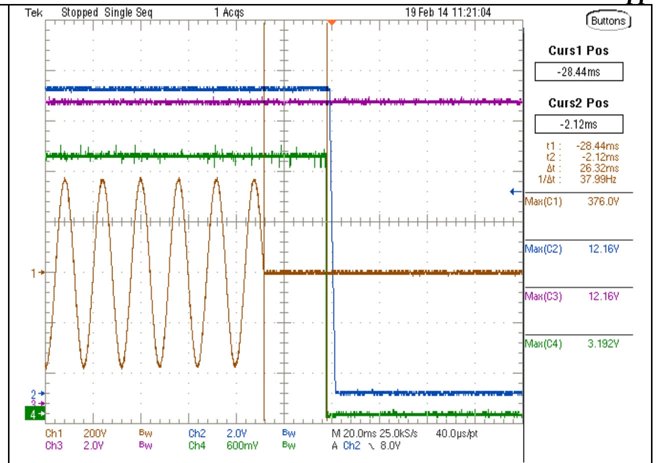
+12Vsb Hold up time (T6); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Hold up time (T6); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:50% Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Hold up time (T6); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12Vsb Hold up time (T6); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:50% Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

7.2 Turn ON/OFF Timing (Tpwok_off)

Delay from PWOK de-asserted to 12V output voltage dropping out of regulation limits.

Test conditions:

Sample NO.1

Vin : 90Vac/47Hz, 264Vac/63Hz

O/P Load : Max, Half Load

AMB : 0°C, 25℃, 50°C

Numerical Result: PASS

AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	1.372	1.394	1.334
	Half	1.412	1.345	1.398
264Vac/63Hz	Max	1.275	1.352	1.355
	Half	1.378	1.367	1.337
SPEC		1ms (min)		

※ **ATS TEST**

AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	1.371	1.422	1.400
	Half	2.414	2.561	3.128
264Vac/63Hz	Max	1.316	1.433	1.363
	Half	2.500	2.552	3.000
SPEC		1ms (min)		

※ **ATS TEST**

7.2 Turn ON/OFF Timing (Tpwok_off)

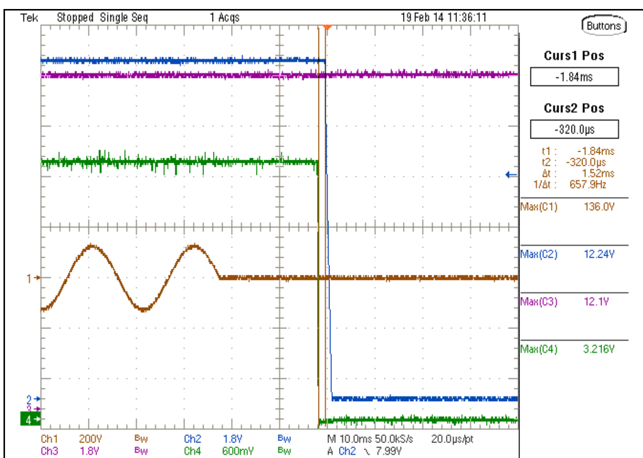
Test conditions:

Sample NO.1

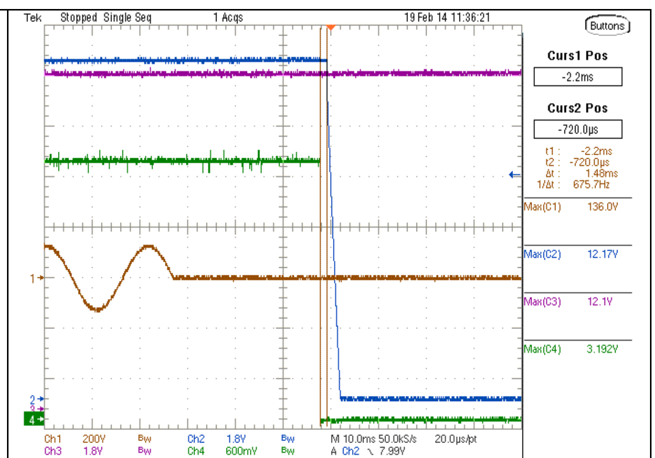
AMB. 25℃

Graphical Result: PASS

Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12V Hold up time (T10); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Max Load	*	1.00	1.52	PASS
+12V Hold up time (T10); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:50% Load	*	1.00	1.48	PASS
+12V Hold up time (T10); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Min Load	*	1.00	2.56	PASS
+12V Hold up time (T10); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Max Load	*	1.00	1.52	PASS
+12V Hold up time (T10); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:50% Load	*	1.00	1.58	PASS
+12V Hold up time (T10); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Min Load	*	1.00	2.62	PASS
+12V Hold up time (T10); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Max Load	*	1.00	1.50	PASS
+12V Hold up time (T10); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:50% Load	*	1.00	1.48	PASS
+12V Hold up time (T10); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Min Load	*	1.00	2.64	PASS
+12V Hold up time (T10); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Max Load	*	1.00	1.46	PASS
+12V Hold up time (T10); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:50% Load	*	1.00	1.52	PASS
+12V Hold up time (T10); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Min Load	*	1.00	2.60	PASS

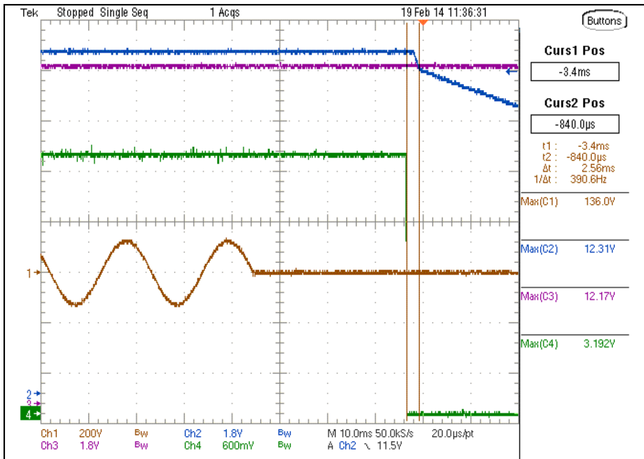
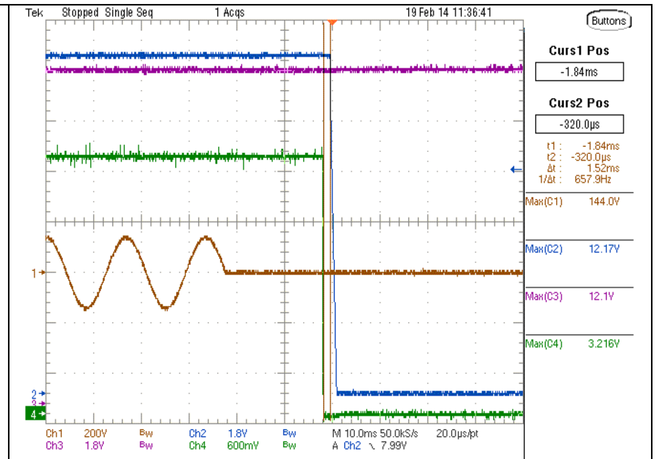


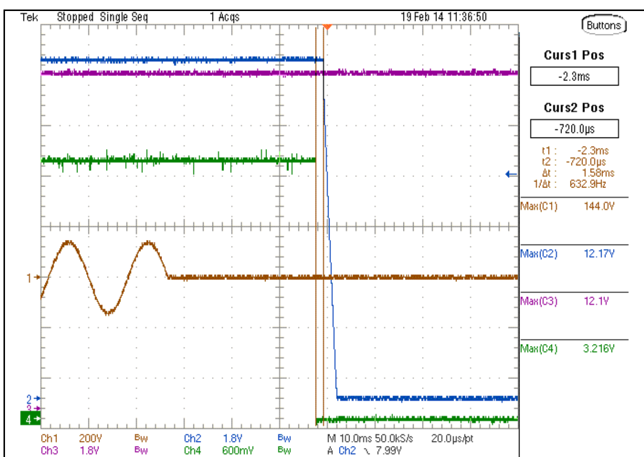
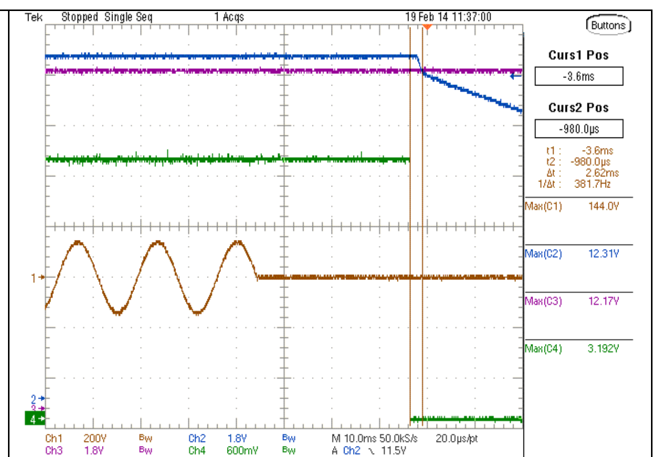
+12V Hold up time (T10); I/P: 90Vac/47Hz
(Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P

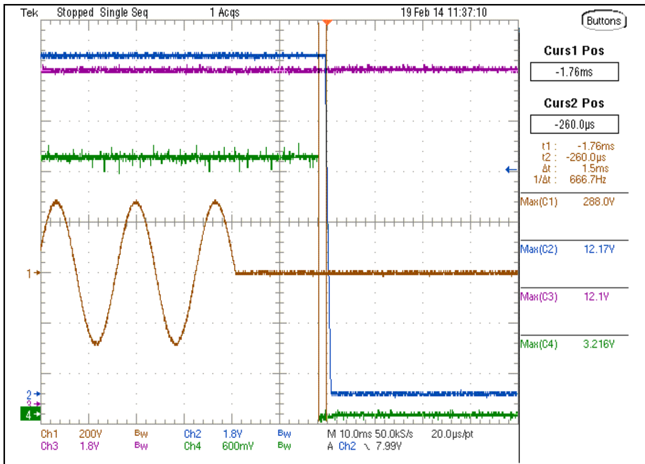


+12V Hold up time (T10); I/P: 90Vac/47Hz
(Off Phase: 0 deg),O/P:50% Load
CH1: AC I/P

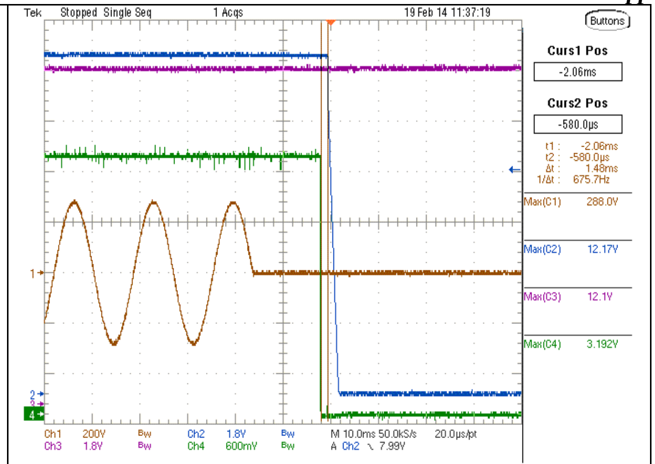
CH2: +12V CH3: +12Vsb CH4: PWOK	CH2: +12V CH3: +12Vsb CH4: PWOK

	
+12V Hold up time (T10); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Min Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	+12V Hold up time (T10); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Max Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

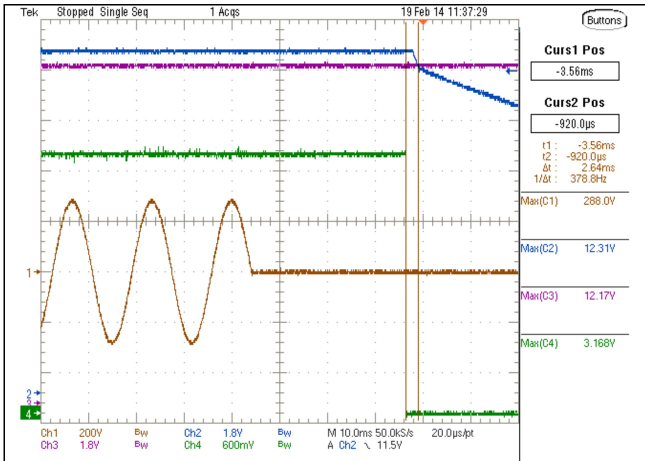
	
+12V Hold up time (T10); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:50% Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	+12V Hold up time (T10); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Min Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK



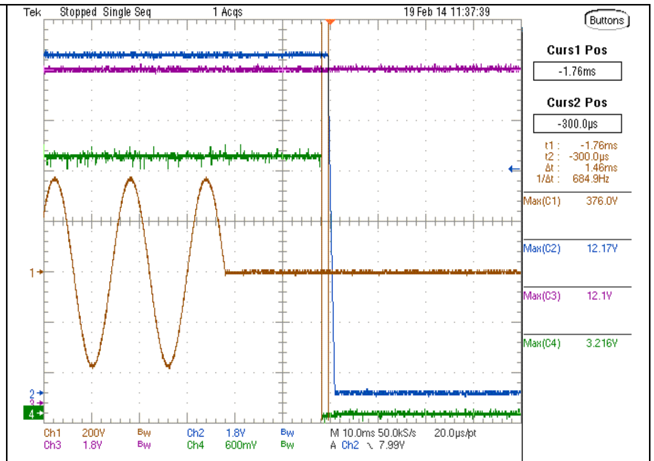
+12V Hold up time (T10); I/P: 200Vac/60Hz
(Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



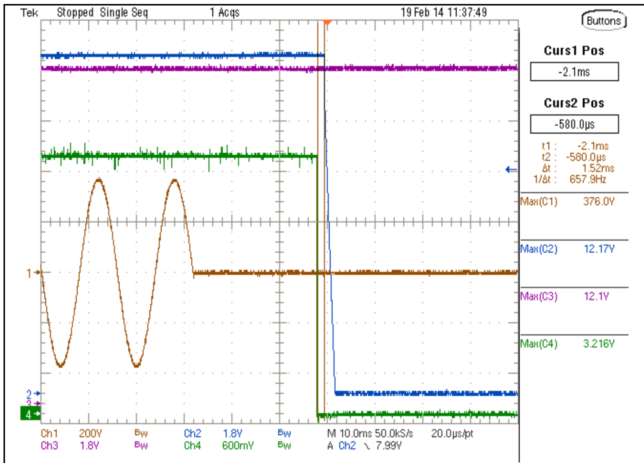
+12V Hold up time (T10); I/P: 200Vac/60Hz
(Off Phase: 0 deg),O/P:50% Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

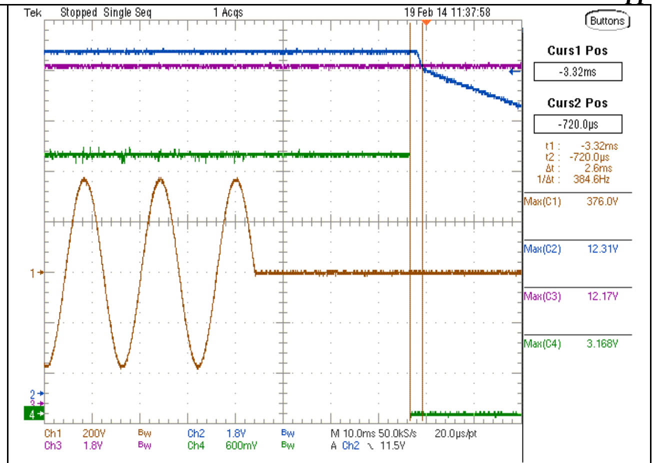


+12V Hold up time (T10); I/P: 200Vac/60Hz
(Off Phase: 0 deg),O/P:Min Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12V Hold up time (T10); I/P: 264Vac/63Hz
(Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK





+12V Hold up time (T10); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:50% Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	+12V Hold up time (T10); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Min Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

7.2 Turn ON/OFF Timing (Tvout_holdup)

Time all output voltages stay within regulation after loss of AC.

Test conditions:

Sample NO.1

Vin : 90Vac/47Hz, 264Vac/63Hz

O/P Load : Max, Half Load

AMB : 0^{o}C, 25℃, 50^{o}C

Numerical Result: PASS

AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)			SPEC (min)
		0^{o}C	25^{o}C	50^{o}C	
90Vac/47Hz	Max	20.881	21.646	22.282	13ms
	Half	33.610	33.672	33.838	11ms
264Vac/63Hz	Max	17.881	18.276	18.752	13ms
	Half	29.879	30.874	31.268	11ms

※ATS TEST

7.2 Turn ON/OFF Timing (Tvout_holdup)

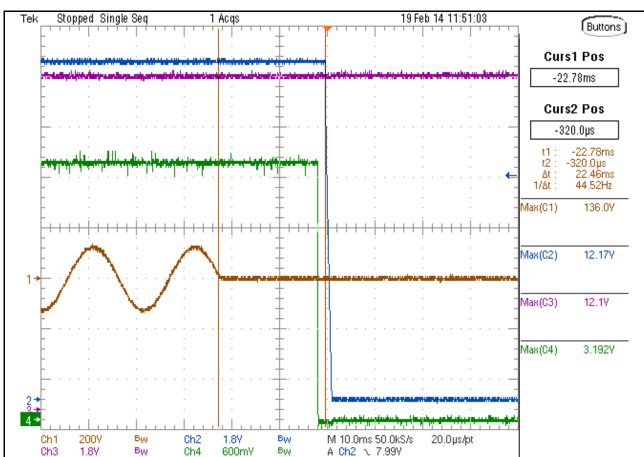
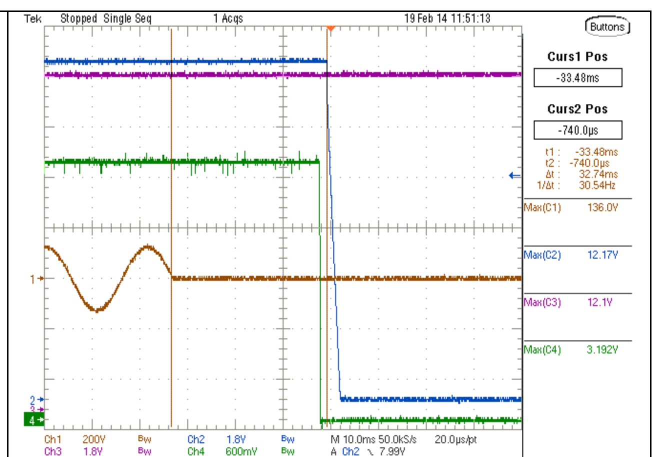
Test conditions:

Sample NO.1

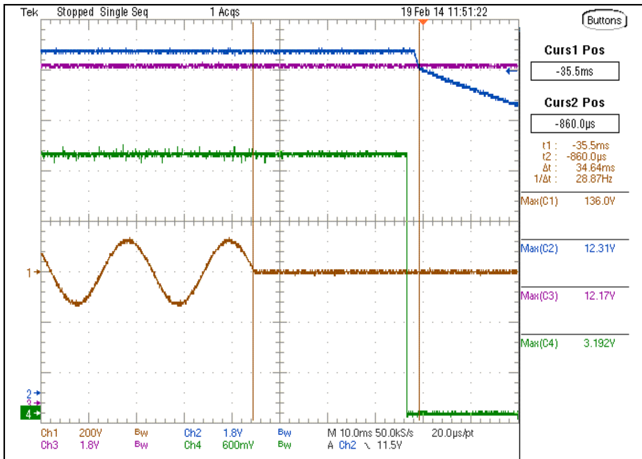
AMB. 25℃

Graphical Result: PASS

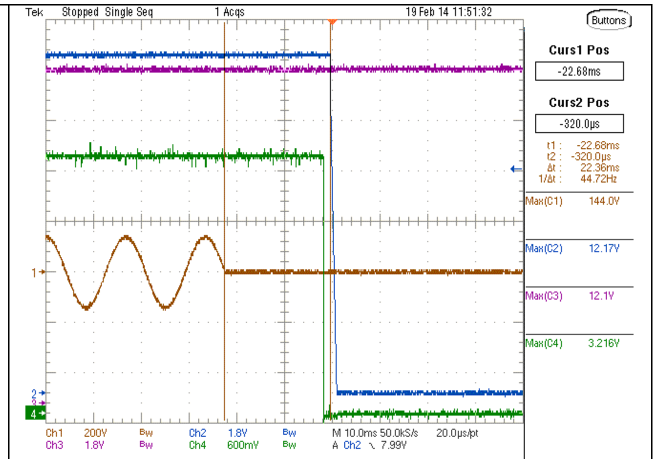
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12V Hold up time (T5); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Max Load	*	13.00	22.46	PASS
+12V Hold up time (T5); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:50% Load	*	10.00	32.74	PASS
+12V Hold up time (T5); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Min Load	*	13.00	34.64	PASS
+12V Hold up time (T5); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Max Load	*	13.00	22.36	PASS
+12V Hold up time (T5); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:50% Load	*	10.00	32.34	PASS
+12V Hold up time (T5); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Min Load	*	13.00	35.12	PASS
+12V Hold up time (T5); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Max Load	*	13.00	19.22	PASS
+12V Hold up time (T5); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:50% Load	*	10.00	15.40	PASS
+12V Hold up time (T5); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Min Load	*	13.00	34.80	PASS
+12V Hold up time (T5); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Max Load	*	13.00	22.14	PASS
+12V Hold up time (T5); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:50% Load	*	10.00	27.78	PASS
+12V Hold up time (T5); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Min Load	*	13.00	34.94	PASS

	
+12V Hold up time (T5); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Max Load CH1: AC I/P CH2: +12V	+12V Hold up time (T5); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:50% Load CH1: AC I/P CH2: +12V

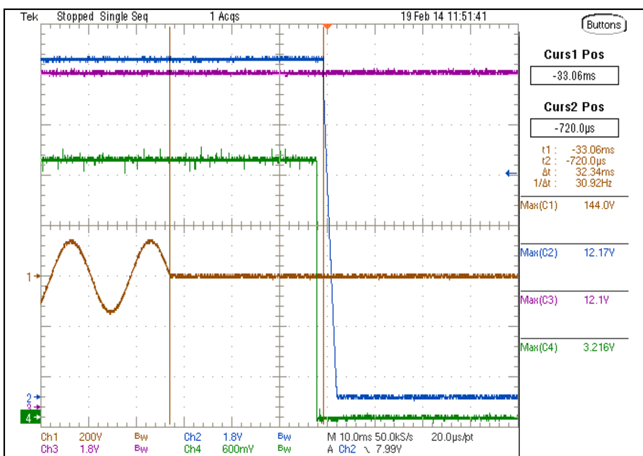
CH3: +12Vsb CH4: PWOK	CH3: +12Vsb CH4: PWOK



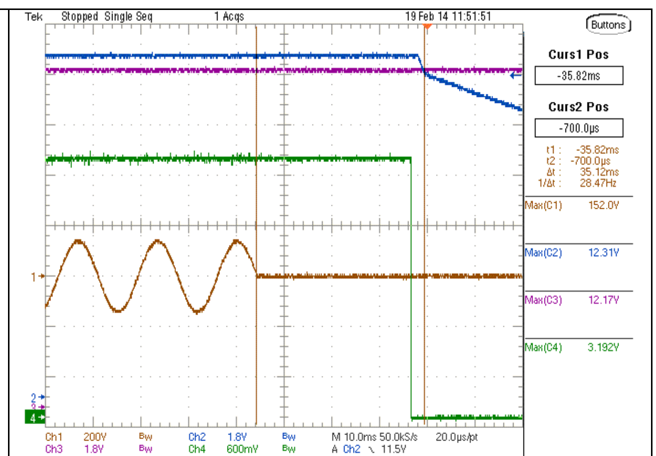
+12V Hold up time (T5); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Min Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



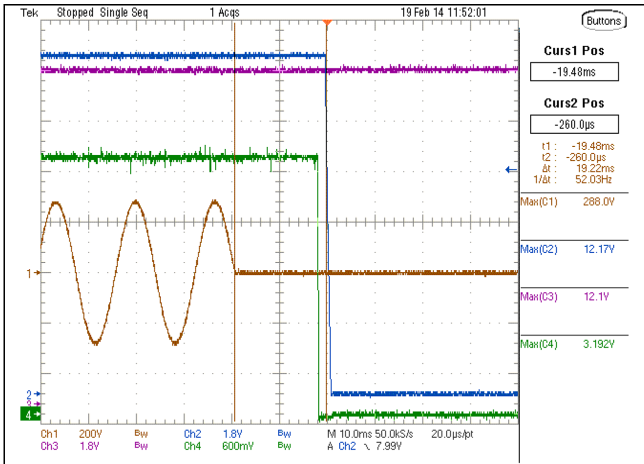
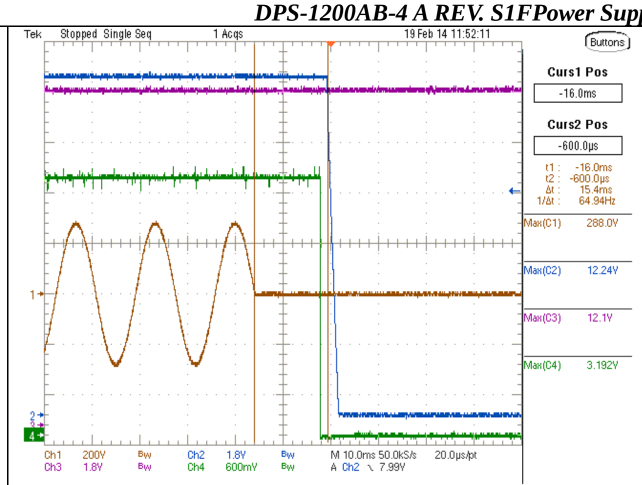
+12V Hold up time (T5); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

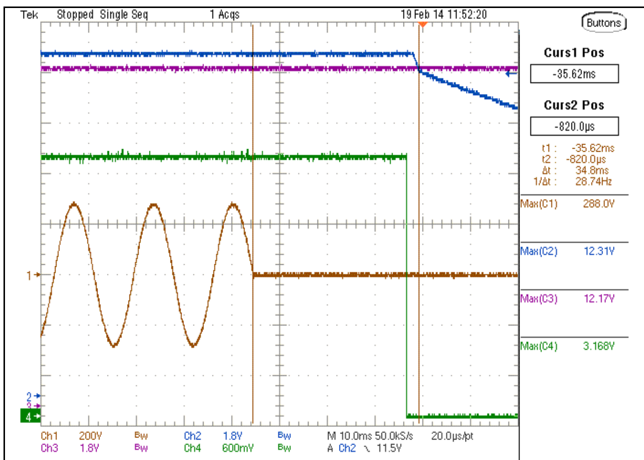
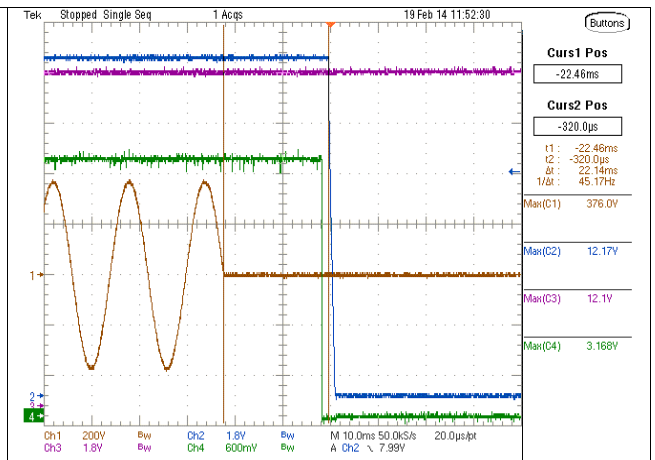


+12V Hold up time (T5); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:50% Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK



+12V Hold up time (T5); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Min Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK

	
+12V Hold up time (T5); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Max Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	+12V Hold up time (T5); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:50% Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

	
+12V Hold up time (T5); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Min Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK	+12V Hold up time (T5); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Max Load CH1: AC I/P CH2: +12V CH3: +12Vsb CH4: PWOK

<table>
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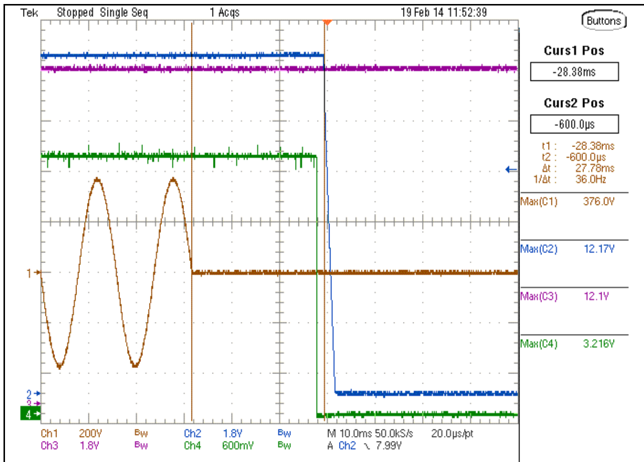
<td>
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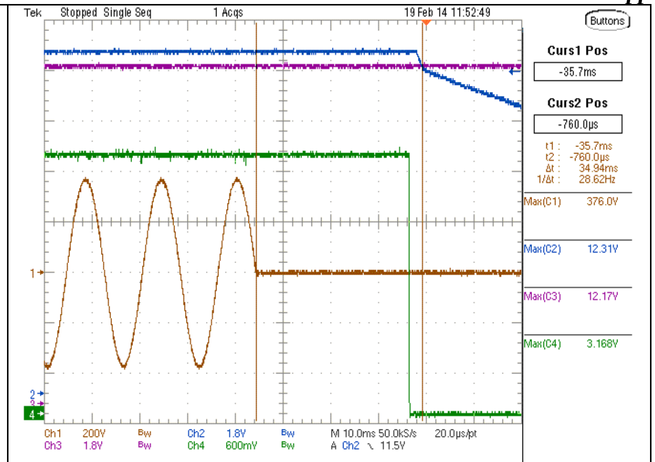
<td>
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<tr>
<td>+12V Hold up time (T5); I/P: 264Vac/63Hz
(Off Phase: 0 deg),O/P:50% Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
<td>+12V Hold up time (T5); I/P: 264Vac/63Hz
(Off Phase: 0 deg),O/P:Min Load
CH1: AC I/P
CH2: +12V
CH3: +12Vsb
CH4: PWOK</td>
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</table>

7.2 Turn ON/OFF Timing (T12Vsb_holdup)

Time the 12Vsb output voltage stays within regulation after loss of AC.

Test conditions:

Sample NO.1

Vin : 90Vac/47Hz, 264Vac/63Hz

O/P Load : Max, Half Load

AMB : 0^{o}C, 25℃, 50^{o}C

Numerical Result: PASS

AC Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0^{o}C	25^{o}C	50^{o}C
90Vac/47Hz	Max	935.461	930.220	956.786
	Half	1618.503	1704.331	1674.800
264Vac/63Hz	Max	870.490	913.226	948.044
	Half	1551.292	1637.793	1663.103
SPEC		70ms (min)		

※ **ATS TEST**

7.2 Turn ON/OFF Timing (T12Vsb_holdup)

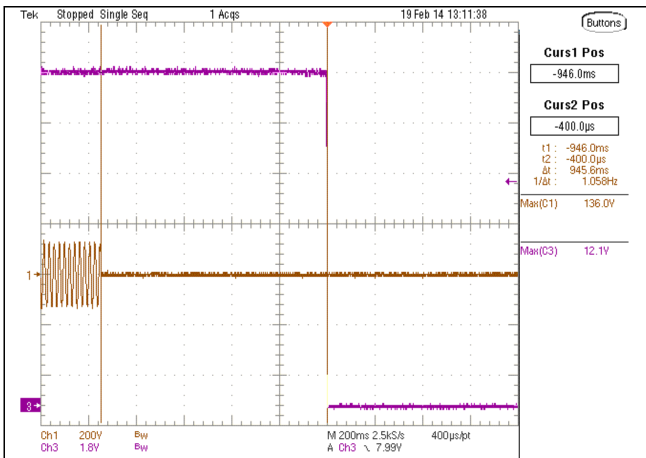
Test conditions:

Sample NO.1

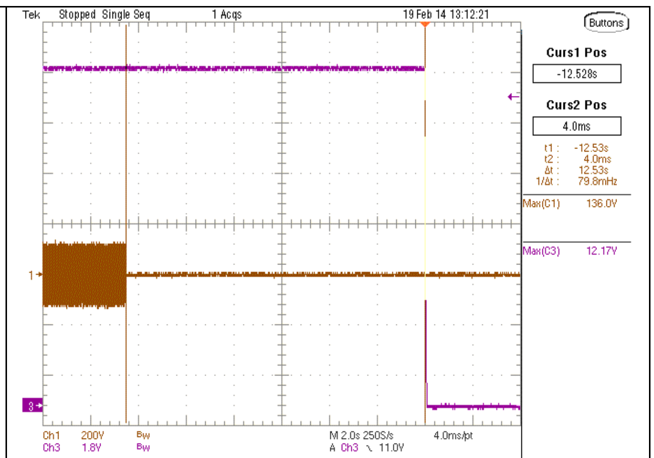
AMB. 25℃

Graphical Result: PASS

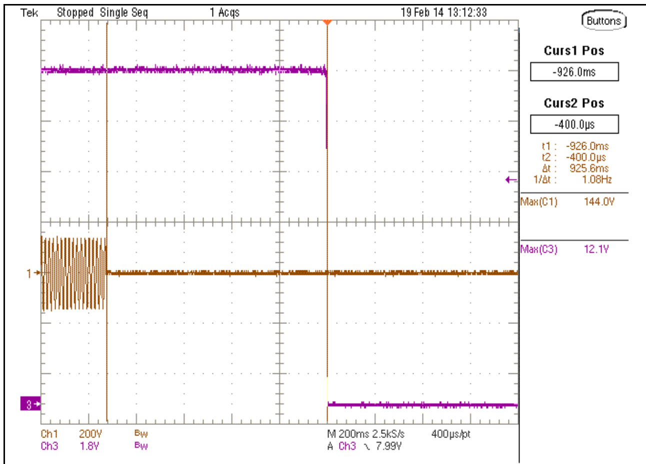
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
+12V Hold up time (T13); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Max Load	*	70.00	945.60	PASS
+12V Hold up time (T13); I/P: 90Vac/47Hz (Off Phase: 0 deg),O/P:Min Load	*	70.00	12532.00	PASS
+12V Hold up time (T13); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Max Load	*	70.00	925.60	PASS
+12V Hold up time (T13); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Min Load	*	70.00	12540.00	PASS
+12V Hold up time (T13); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Max Load	*	70.00	903.60	PASS
+12V Hold up time (T13); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Min Load	*	70.00	12520.00	PASS
+12V Hold up time (T13); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Max Load	*	70.00	969.20	PASS
+12V Hold up time (T13); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Min Load	*	70.00	12528.00	PASS



+12V Hold up time (T13); I/P: 90Vac/47Hz
(Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH3: +12Vsb



+12V Hold up time (T13); I/P: 90Vac/47Hz
(Off Phase: 0 deg),O/P:Min Load
CH1: AC I/P
CH3: +12Vsb



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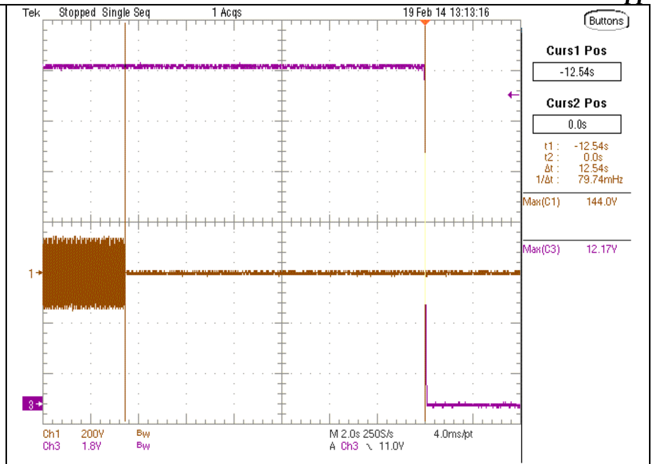
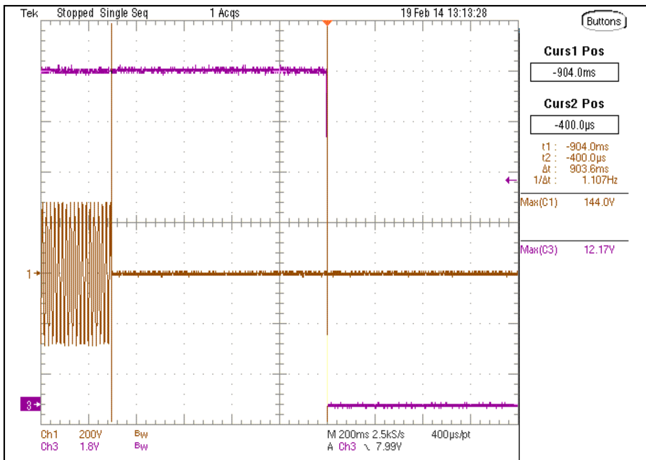
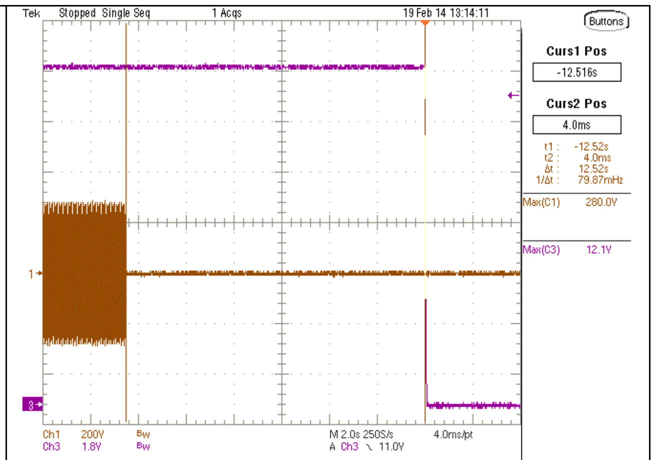
CH1: AC I/P
CH3: +12Vsb



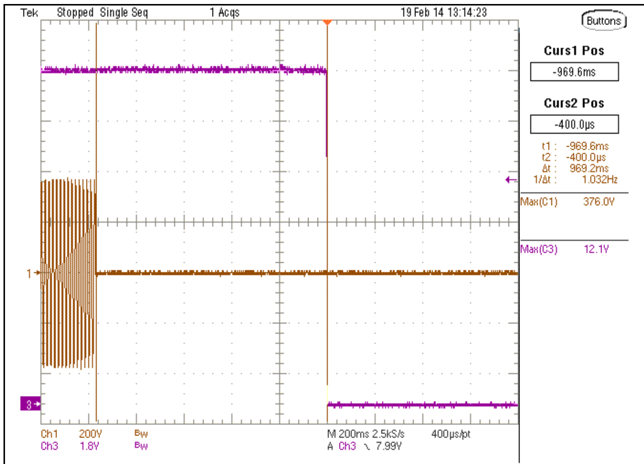
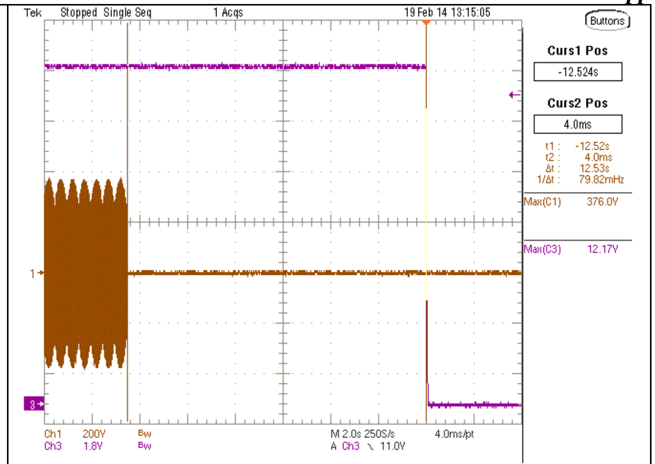
+12V Hold up time (T13); I/P: 100Vac/60Hz (Off Phase: 0 deg),O/P:Min Load
CH1: AC I/P
CH3: +12Vsb



+12V Hold up time (T13); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Max Load
CH1: AC I/P
CH3: +12Vsb



+12V Hold up time (T13); I/P: 200Vac/60Hz (Off Phase: 0 deg),O/P:Min Load
CH1: AC I/P
CH3: +12Vsb

	
+12V Hold up time (T13); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Max Load CH1: AC I/P CH3: +12Vsb	+12V Hold up time (T13); I/P: 264Vac/63Hz (Off Phase: 0 deg),O/P:Min Load CH1: AC I/P CH3: +12Vsb

7.2 Turn ON/OFF Timing (PSON ON/OFF)

7.2 Turn ON/OFF Timing (Tpwok_on)

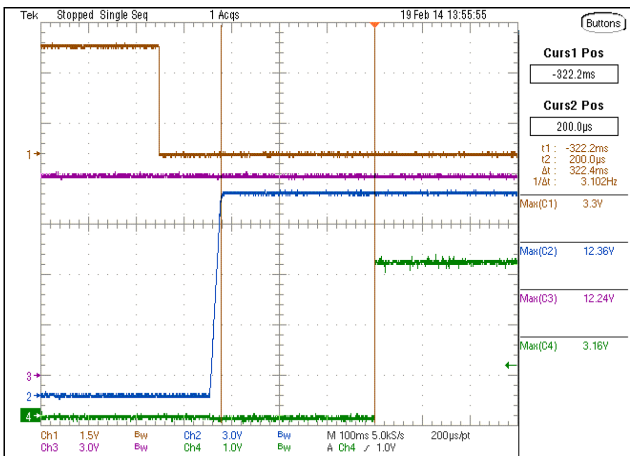
Test conditions:

Sample NO.1

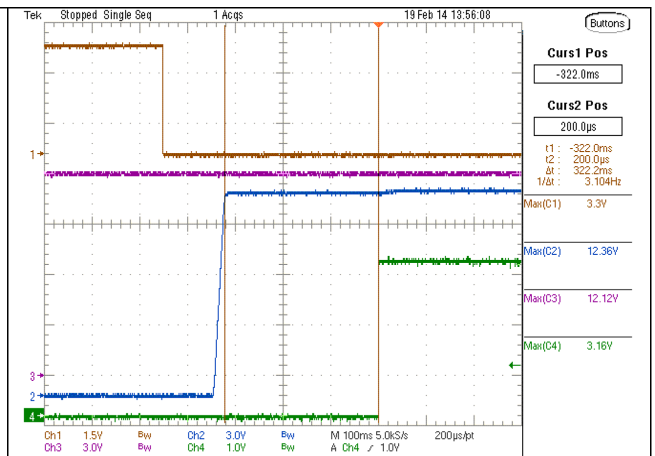
AMB. 25℃

Graphical Result: PASS

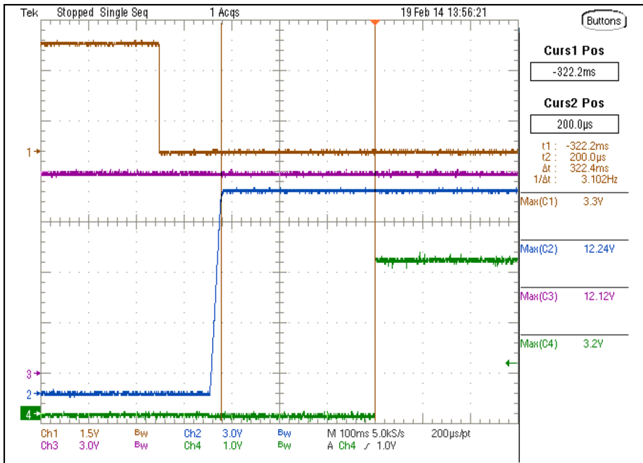
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
PSON-up time (T9); I/P: 90Vac,O/P:Max load for PWOK	500.00	100.00	322.40	PASS
PSON-up time (T9); I/P: 90Vac,O/P:Min load for PWOK	500.00	100.00	322.20	PASS
PSON-up time (T9); I/P: 100Vac,O/P:Max load for PWOK	500.00	100.00	322.40	PASS
PSON-up time (T9); I/P: 100Vac,O/P:Min load for PWOK	500.00	100.00	322.60	PASS
PSON-up time (T9); I/P: 200Vac,O/P:Max load for PWOK	500.00	100.00	322.40	PASS
PSON-up time (T9); I/P: 200Vac,O/P:Min load for PWOK	500.00	100.00	322.20	PASS
PSON-up time (T9); I/P: 264Vac,O/P:Max load for PWOK	500.00	100.00	322.20	PASS
PSON-up time (T9); I/P: 264Vac,O/P:Min load for PWOK	500.00	100.00	322.40	PASS



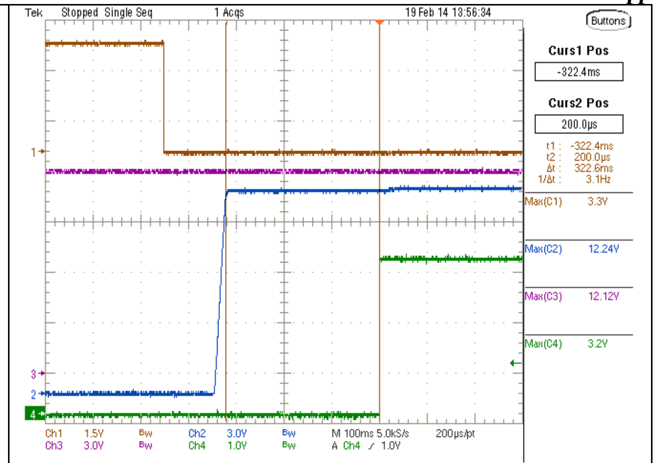
PSON-up time (T9); I/P: 90Vac,O/P:Max load for PWOK
CH1: PSON
CH2: +12V
CH3: +12Vsb
CH4: PWOK



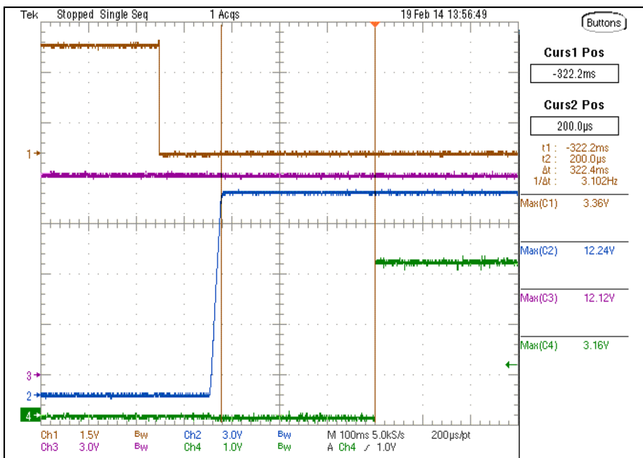
PSON-up time (T9); I/P: 90Vac,O/P:Min load for PWOK
CH1: PSON
CH2: +12V
CH3: +12Vsb
CH4: PWOK



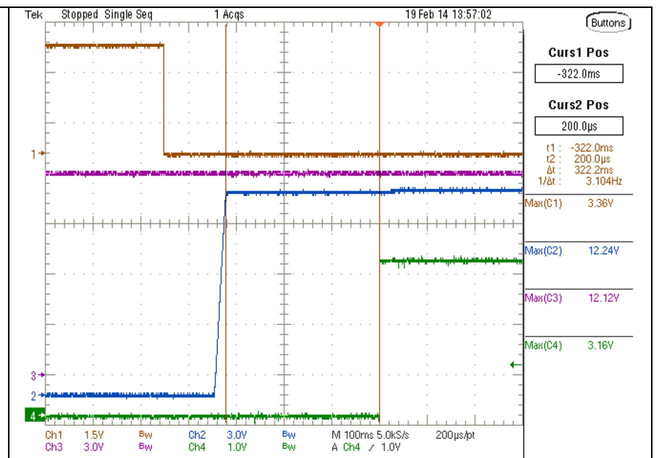
PSON-up time (T9); I/P: 100Vac,O/P:Max load for PWOK
CH1: PSON
CH2: +12V
CH3: +12Vsb
CH4: PWOK



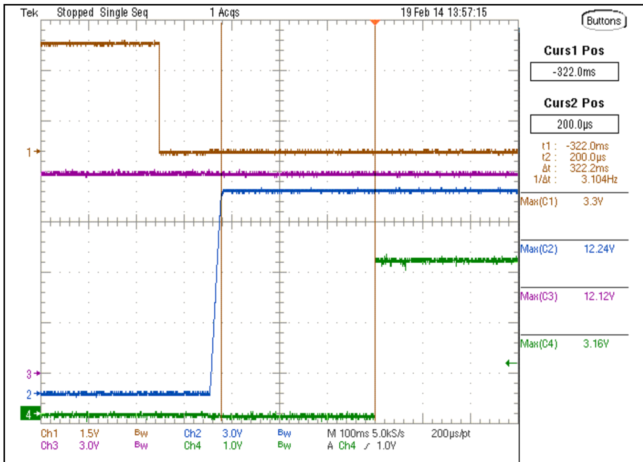
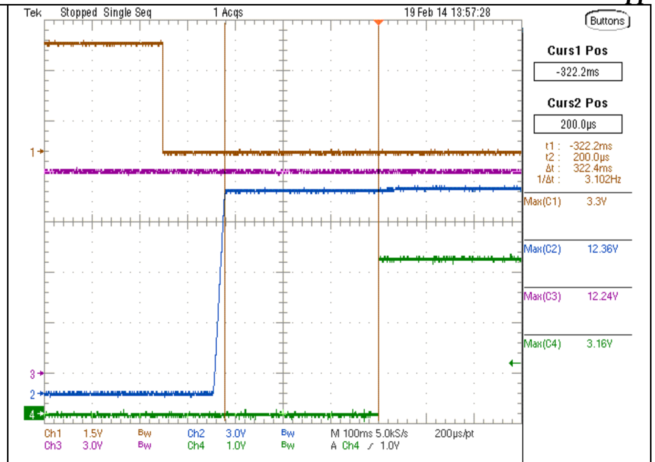
PSON-up time (T9); I/P: 100Vac,O/P:Min load for PWOK
CH1: PSON
CH2: +12V
CH3: +12Vsb
CH4: PWOK



PSON-up time (T9); I/P: 200Vac,O/P:Max load for PWOK
CH1: PSON
CH2: +12V
CH3: +12Vsb
CH4: PWOK



PSON-up time (T9); I/P: 200Vac,O/P:Min load for PWOK
CH1: PSON
CH2: +12V
CH3: +12Vsb
CH4: PWOK

	
PSON-up time (T9); I/P: 264Vac,O/P:Max load for PWOK CH1: PSON CH2: +12V CH3: +12Vsb CH4: PWOK	PSON-up time (T9); I/P: 264Vac,O/P:Min load for PWOK CH1: PSON CH2: +12V CH3: +12Vsb CH4: PWOK

7.2 Turn ON/OFF Timing (Tpson_on_delay)

Delay from PSON# active to output voltages within regulation limits.

Test conditions:
Sample NO.1
Vin : 90Vac/47Hz, 264Vac/63Hz
O/P Load : Max, Min Load
AMB : 0°C, 25℃, 50°C

Numerical Result: PASS

PSON Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0°C	25°C	50°C
90Vac/47Hz	Max	128.715	128.642	127.583
	Min	128.514	128.356	127.204
264Vac/63Hz	Max	128.741	128.505	127.434
	Min	128.289	128.511	126.931
SPEC		5ms ~ 400ms		

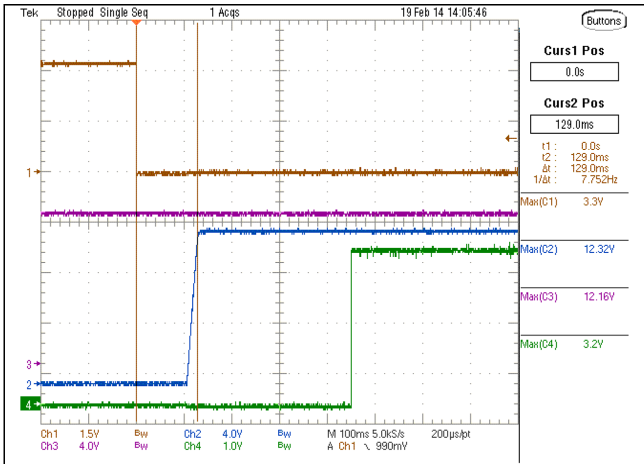
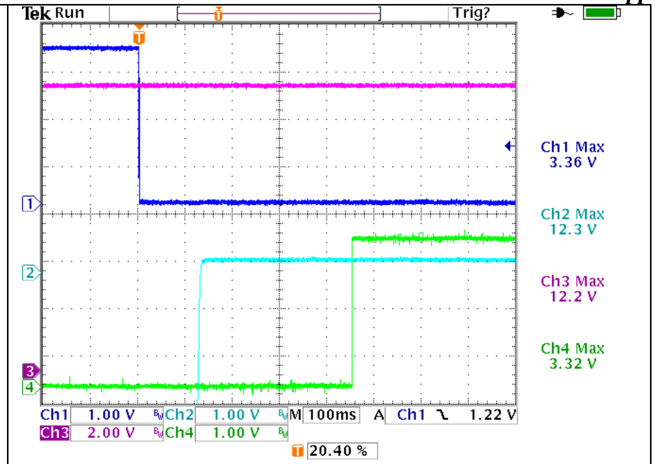
Test conditions:

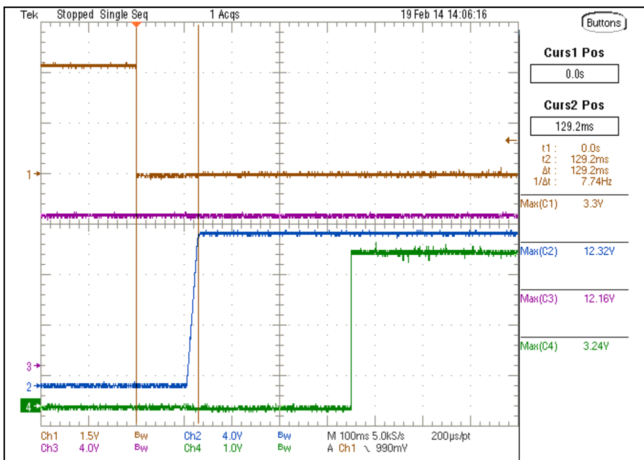
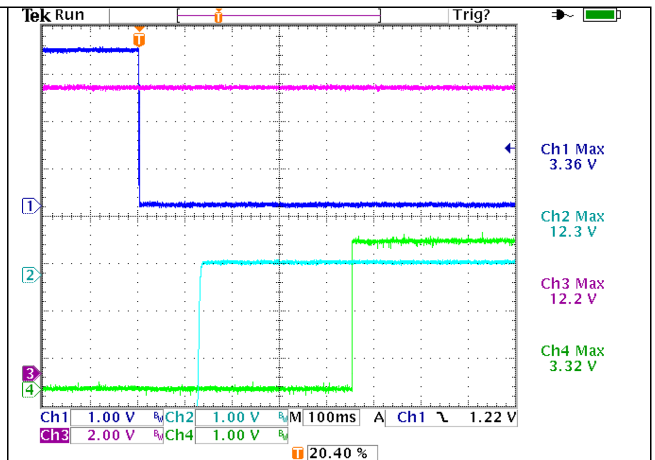
Sample NO.1

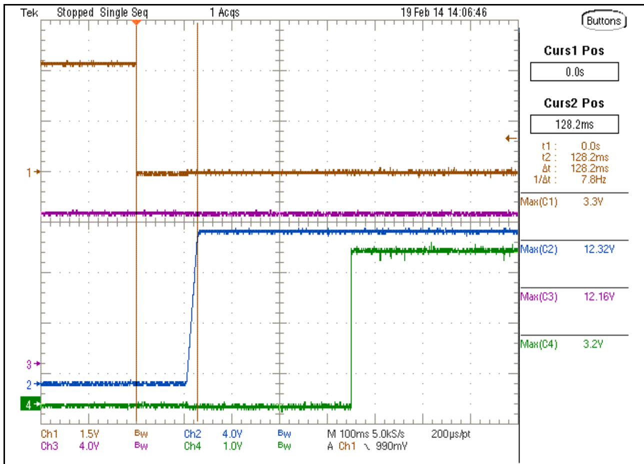
AMB. 25℃

Graphical Result: PASS

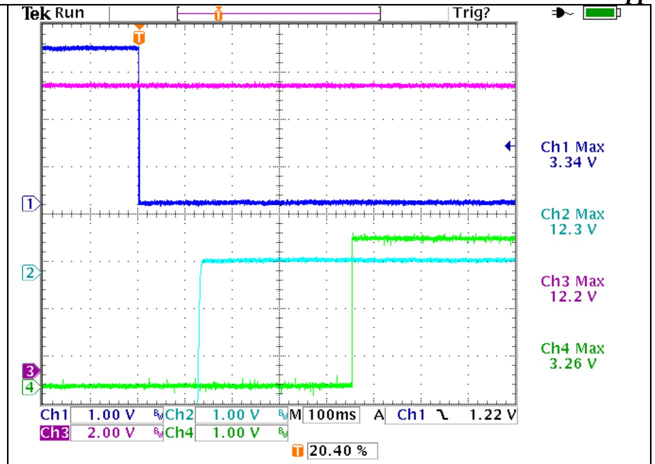
Test Condition	Time max (m-sec)	Time min (m-sec)	Reading(ms)	Result
Power Turn on Time (T7); I/P:90Vac,O/P:Max load ,+12V vs PSON	400.00	5.00	129.00	PASS
Power Turn on Time (T7); I/P:90Vac,O/P:Min load ,+12V vs PSON	400.00	5.00	128.20	PASS
Power Turn on Time (T7); I/P:100Vac,O/P:Max load ,+12V vs PSON	400.00	5.00	129.20	PASS
Power Turn on Time (T7); I/P:100Vac,O/P:Min load ,+12V vs PSON	400.00	5.00	128.80	PASS
Power Turn on Time (T7); I/P:200Vac,O/P:Max load ,+12V vs PSON	400.00	5.00	128.20	PASS
Power Turn on Time (T7); I/P:200Vac,O/P:Min load ,+12V vs PSON	400.00	5.00	128.80	PASS
Power Turn on Time (T7); I/P:264Vac,O/P:Max load ,+12V vs PSON	400.00	5.00	128.80	PASS
Power Turn on Time (T7); I/P:264Vac,O/P:Min load ,+12V vs PSON	400.00	5.00	128.20	PASS

	
Power Turn on Time (T7); I/P:90Vac,O/P:Max load ,+12V vs PSON CH1: PSON# CH2: +12V CH3: +12Vsb CH4: PWOK	Power Turn on Time (T7); I/P:90Vac,O/P:Min load ,+12V vs PSON CH1: PSON# CH2: +12V (Offest 12V) CH3: +12Vsb CH4: PWOK

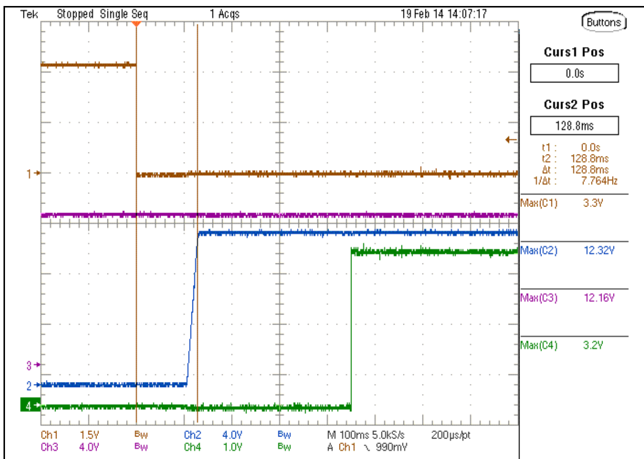
	
Power Turn on Time (T7); I/P:100Vac,O/P:Max load ,+12V vs PSON CH1: PSON# CH2: +12V CH3: +12Vsb CH4: PWOK	Power Turn on Time (T7); I/P:100Vac,O/P:Min load ,+12V vs PSON CH1: PSON# CH2: +12V (Offest 12V) CH3: +12Vsb CH4: PWOK



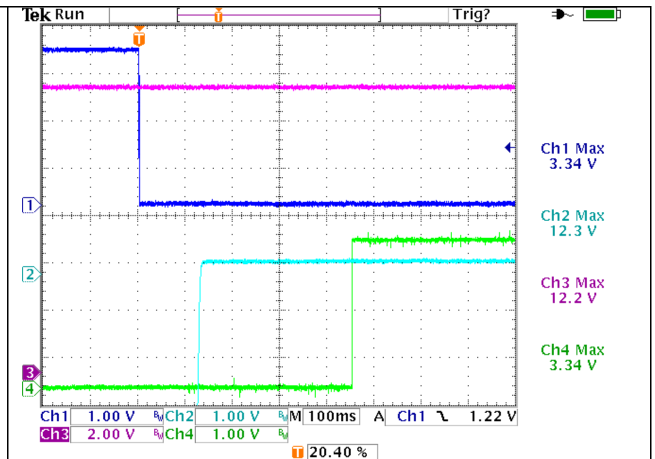
Power Turn on Time (T7); I/P:200Vac,O/P:Max load ,+12V vs PSON
CH1: PSON#
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Power Turn on Time (T7); I/P:200Vac,O/P:Min load ,+12V vs PSON
CH1: PSON#
CH2: +12V (Offest 12V)
CH3: +12Vsb
CH4: PWOK



Power Turn on Time (T7); I/P:264Vac,O/P:Max load ,+12V vs PSON
CH1: PSON#
CH2: +12V
CH3: +12Vsb
CH4: PWOK



Power Turn on Time (T7); I/P:264Vac,O/P:Min load ,+12V vs PSON
CH1: PSON#
CH2: +12V (Offest 12V)
CH3: +12Vsb
CH4: PWOK

7.2 Turn ON/OFF Timing (Tpson_pwok)

Delay from PSON# de-active to PWOK being de-asserted.

Test conditions:

Sample NO.1

Vin : 90Vac/47Hz, 264Vac/63Hz

O/P Load : Max, Min Load

AMB : 0^{o}C, 25℃, 50^{o}C

Numerical Result: PASS

PSON Turn on/off cycle

AC Condition	O/P Load	Timing Reading (mS)		
		0^{o}C	25^{o}C	50^{o}C
90Vac/47Hz	Max	3.850	3.757	3.759
	Min	4.006	4.083	3.634
264Vac/63Hz	Max	3.792	3.697	4.129
	Min	3.963	3.794	3.903
SPEC		5ms (max)		

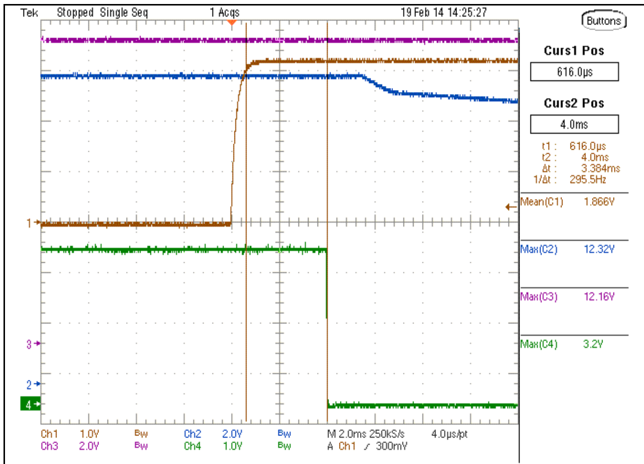
Test conditions:

Sample NO.1

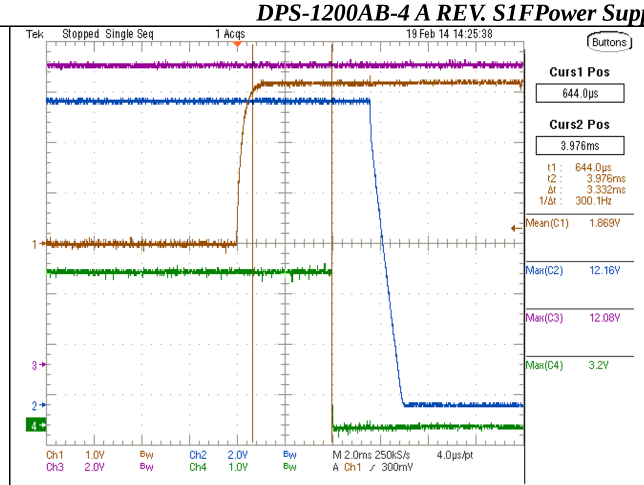
AMB. 25℃

Graphical Result: PASS

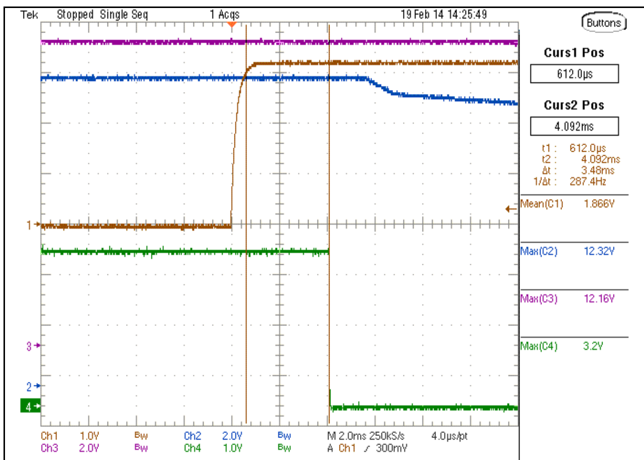
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
PSON time Turn off(T8) ; I/P:90Vac,O/P:Min load	5.00	*	3.38	PASS
PSON time Turn off(T8) ; I/P:90Vac,O/P:Max load	5.00	*	3.33	PASS
PSON time Turn off(T8) ; I/P:100Vac,O/P:Min load	5.00	*	3.48	PASS
PSON time Turn off(T8) ; I/P:100Vac,O/P:Max load	5.00	*	3.28	PASS
PSON time Turn off(T8) ; I/P:200Vac,O/P:Min load	5.00	*	3.43	PASS
PSON time Turn off(T8) ; I/P:200Vac,O/P:Max load	5.00	*	3.42	PASS
PSON time Turn off(T8) ; I/P:264Vac,O/P:Min load	5.00	*	3.29	PASS
PSON time Turn off(T8) ; I/P:264Vac,O/P:Max load	5.00	*	3.30	PASS



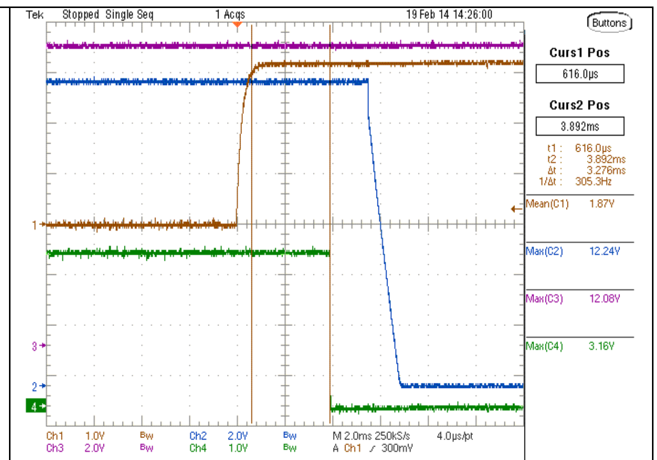
PSON time Turn off(T8) ; I/P:90Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



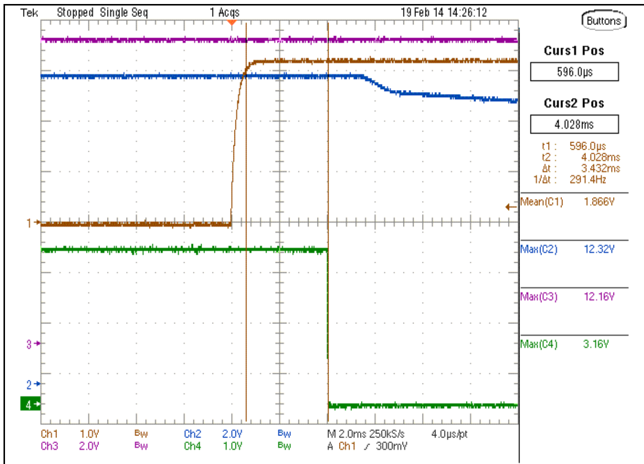
PSON time Turn off(T8) ; I/P:90Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



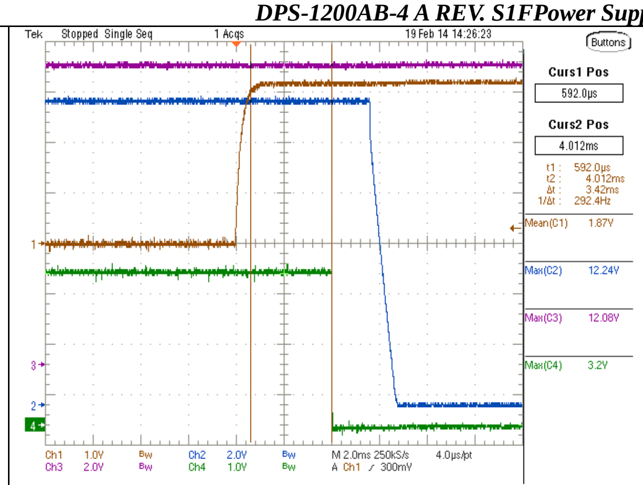
PSON time Turn off(T8) ; I/P:100Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



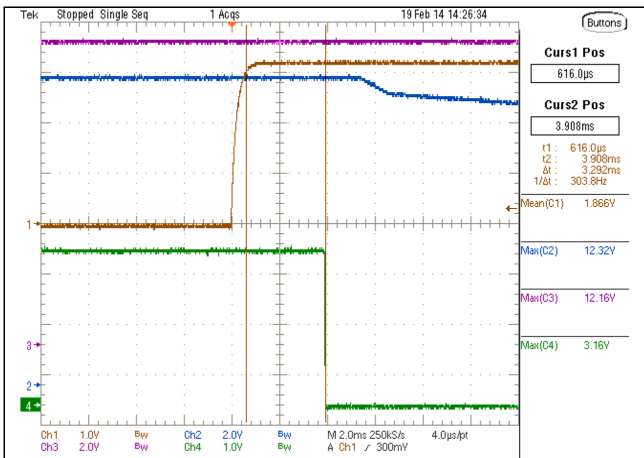
PSON time Turn off(T8) ; I/P:100Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



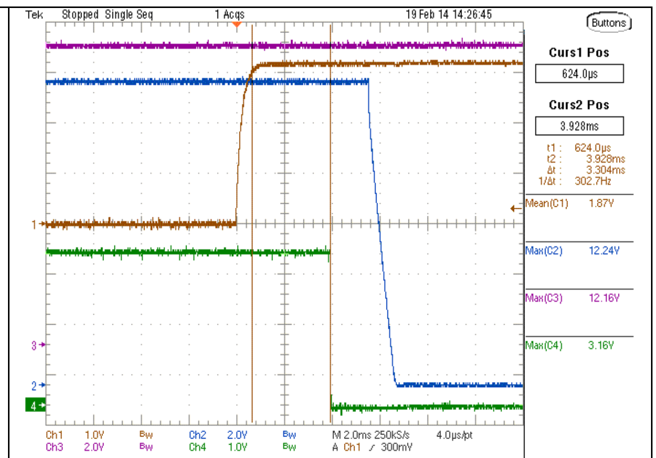
PSON time Turn off(T8) ; I/P:200Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn off(T8) ; I/P:200Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn off(T8) ; I/P:264Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn off(T8) ; I/P:264Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK

7.2 Turn ON/OFF Timing (Tpson_pwok)

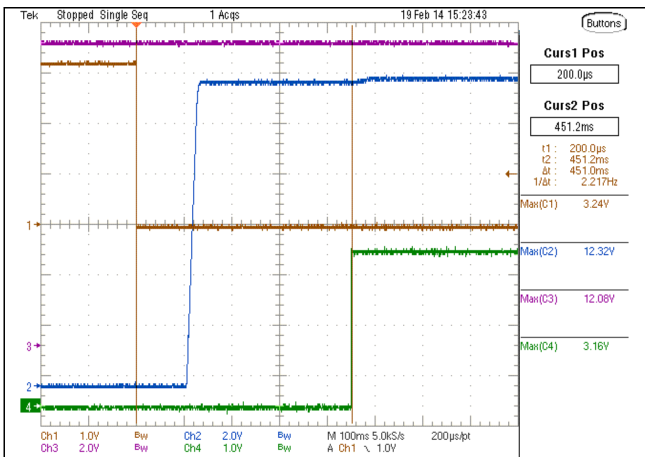
Test conditions:

Sample NO.1

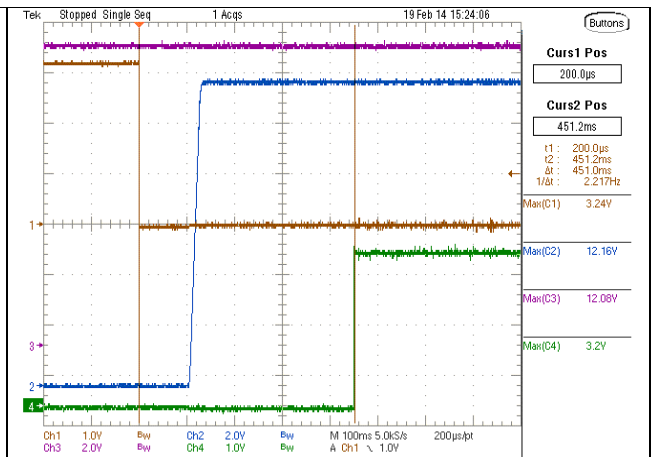
AMB. 25℃

Graphical Result: PASS

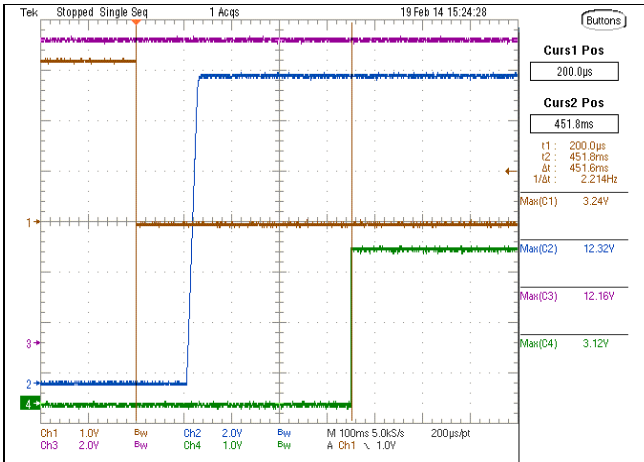
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
PSON time Turn on(Tpson_pwok) ; I/P:90Vac,O/P:Min load	*	*	451.00	PASS
PSON time Turn on(Tpson_pwok) ; I/P:90Vac,O/P:Max load	*	*	451.00	PASS
PSON time Turn on(Tpson_pwok) ; I/P:100Vac,O/P:Min load	*	*	451.60	PASS
PSON time Turn on(Tpson_pwok) ; I/P:100Vac,O/P:Max load	*	*	451.00	PASS
PSON time Turn on(Tpson_pwok) ; I/P:200Vac,O/P:Min load	*	*	451.40	PASS
PSON time Turn on(Tpson_pwok) ; I/P:200Vac,O/P:Max load	*	*	451.00	PASS
PSON time Turn on(Tpson_pwok) ; I/P:264Vac,O/P:Min load	*	*	451.20	PASS
PSON time Turn on(Tpson_pwok) ; I/P:264Vac,O/P:Max load	*	*	451.60	PASS



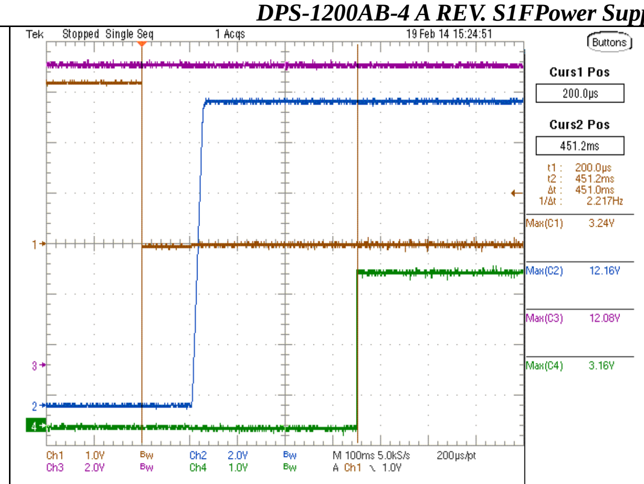
PSON time Turn on(Tpson_pwok) ;
I/P:90Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



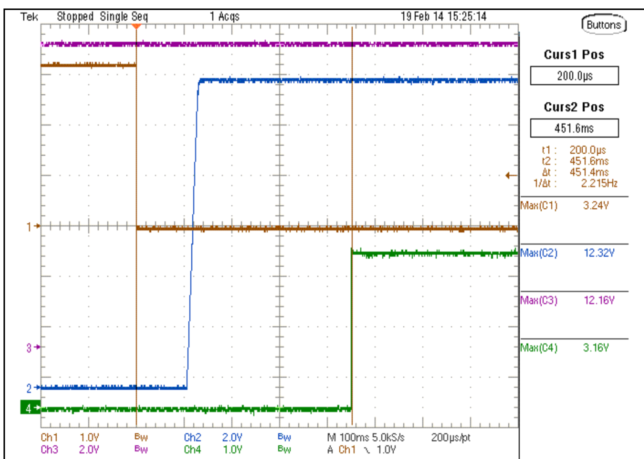
PSON time Turn on(Tpson_pwok) ;
I/P:90Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



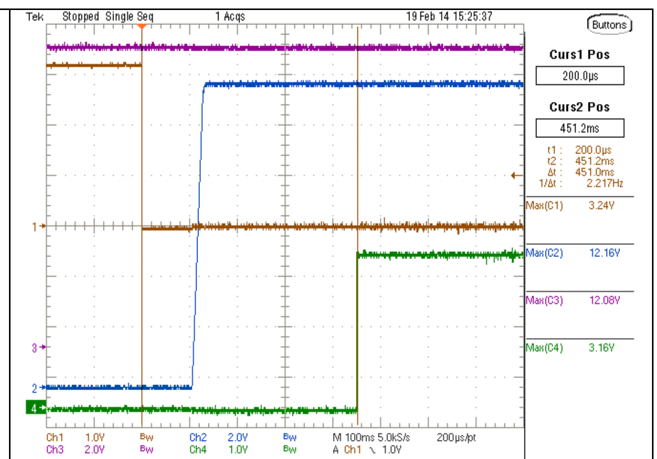
PSON time Turn on(Tpson_pwok) ;
I/P:100Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



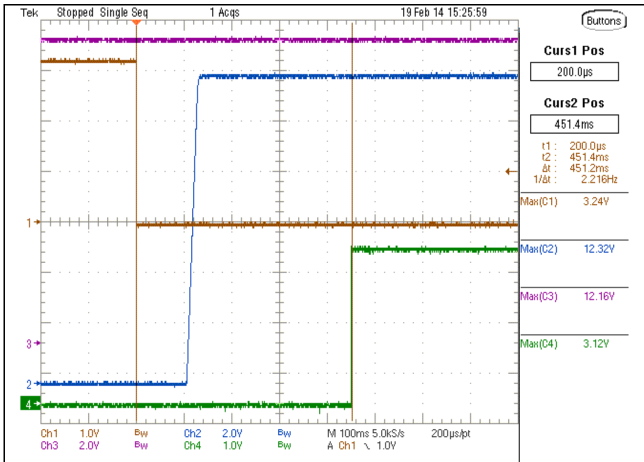
PSON time Turn on(Tpson_pwok) ;
I/P:100Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



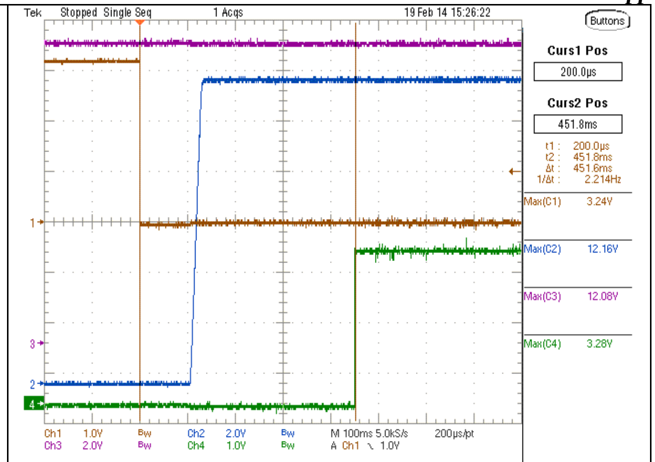
PSON time Turn on(Tpson_pwok) ;
I/P:200Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn on(Tpson_pwok) ;
I/P:200Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn on(Tpson_pwok) ;
I/P:264Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn on(Tpson_pwok) ;
I/P:264Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK

7.2 Turn ON/OFF Timing (Tpwok_off)

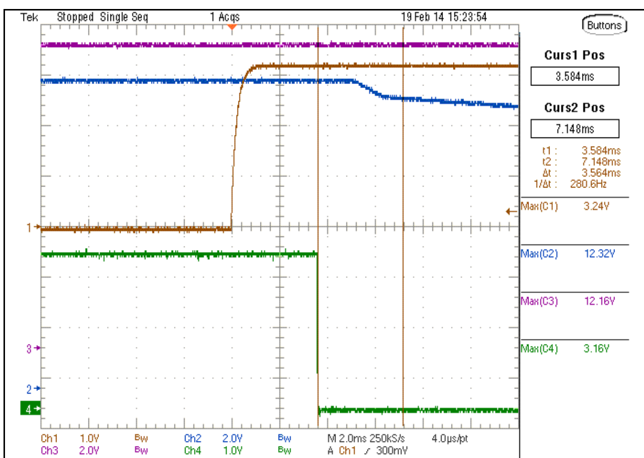
Test conditions:

Sample NO.1

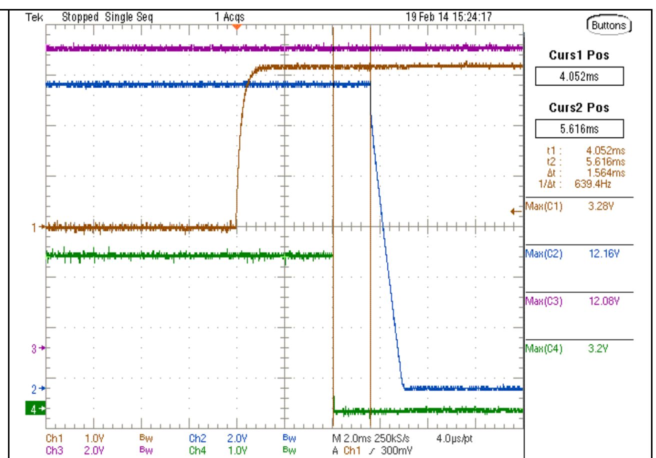
AMB. 25℃

Graphical Result: PASS

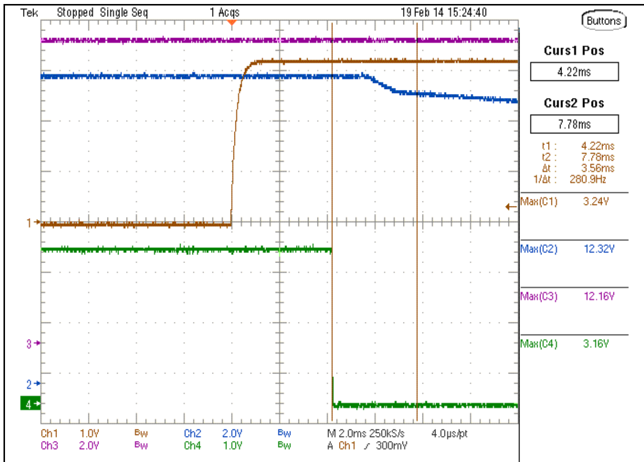
Test Condition	Spec Max (mS)	Spec Min (mS)	Reading (mS)	Result
PSON time Turn off(Tpwok_off) ; I/P:90Vac,O/P:Min load	*	*	3.56	PASS
PSON time Turn off(Tpwok_off) ; I/P:90Vac,O/P:Max load	*	*	1.56	PASS
PSON time Turn off(Tpwok_off) ; I/P:100Vac,O/P:Min load	*	*	3.56	PASS
PSON time Turn off(Tpwok_off) ; I/P:100Vac,O/P:Max load	*	*	1.61	PASS
PSON time Turn off(Tpwok_off) ; I/P:200Vac,O/P:Min load	*	*	3.05	PASS
PSON time Turn off(Tpwok_off) ; I/P:200Vac,O/P:Max load	*	*	1.56	PASS
PSON time Turn off(Tpwok_off) ; I/P:264Vac,O/P:Min load	*	*	3.47	PASS
PSON time Turn off(Tpwok_off) ; I/P:264Vac,O/P:Max load	*	*	1.52	PASS



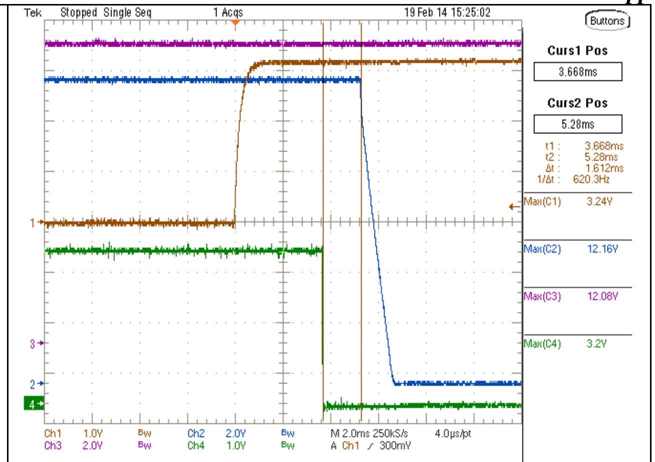
PSON time Turn off(Tpwok_off) ;
I/P:90Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



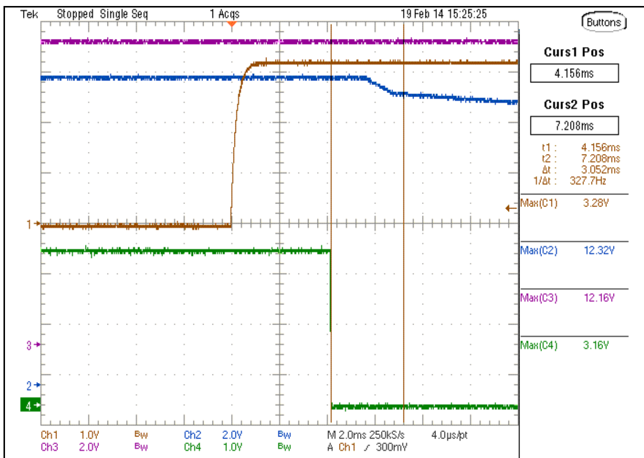
PSON time Turn off(Tpwok_off) ;
I/P:90Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



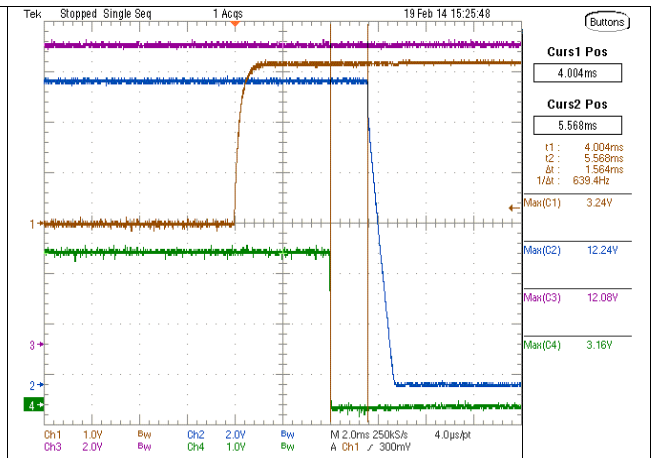
PSON time Turn off(Tpwok_off) ;
I/P:100Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



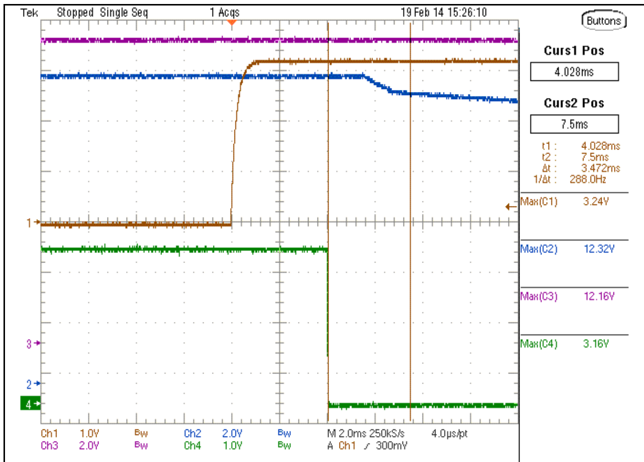
PSON time Turn off(Tpwok_off) ;
I/P:100Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



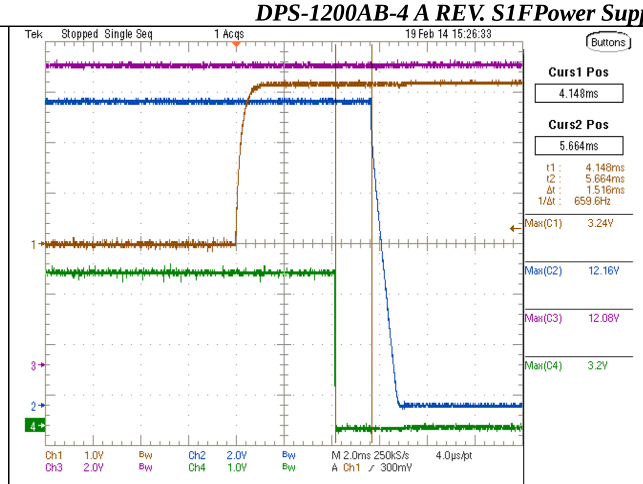
PSON time Turn off(Tpwok_off) ;
I/P:200Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn off(Tpwok_off) ;
I/P:200Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn off(Tpwok_off) ;
I/P:264Vac,O/P:Min load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK



PSON time Turn off(Tpwok_off) ;
I/P:264Vac,O/P:Max load
(1) PSON
(2) 12V
(3) 12Vsb
(4) PWOK

9. Peak Power Test Requirements (N/A)

All of the peak power requirement only for high line operation applications and then all of the components need meet component specification 100% rating when PSU working at peak power application.

9.1 Over Power Protection(OPP)

The power supply shall support over power protection (OPP) level low enough to protect the power supply running in this mode for repeated 1msec durations at a 1% duty cycle. The power supply shall be stable operating at any load point from rated power up to the OPP point.

OPP threshold: 1800W +/-72W

SMBAlert shall always assert ahead of the OPP threshold being exceeded

If system operation from rated power up to OPP point TDP>10sec, Pdyn>9ms, Pmax>100us and/or step down from above to rated power<10min then allowable PSU can shut down in protection mode.

9.2 Over Power Protection testing without system bulk capacitance

A. Apply rated PSU load in constant resistance mode
B. Drop load resistance to +20% over the OPP level so that the voltage folds back to 9.60V for a 1msec pulse duration
C. Repeat test at a 10% duty cycle
D. Pass/Fail criteria: stable voltage fold back, no PSU shutdown, no PSU overheating

9.3 Fast output current sensing testing

A. Apply maximum rated PSU load
B. Drop load resistance to +5% over the OPP level so that the voltage folds back to 11.40V for a 1msec pulse duration
C. Measure the timing from output current exceeding $I_{throttle}$ to SMBAlert asserting
D. Measure timing SMBAlert is held low; $T_{smbalert\_latch}$.

9.4 Peak load support testing with system bulk capacitance

A. Setup System capacitance
B. Set load to 1200W
C. Apply peak load duration to power supply; ramp rate = 0.5A/µsec
D. Monitor output voltage at remote sense; must maintain +/-5% and no more than -2% undershoot
E. Test with various system capacitances & peak power duration

Table 22: peak power support testing with system capacitance load

Peak Load	Peak Load Duration	System Capacitance	Voltage undershoot
1600W	100µsec	4,000 µF	-5%
1800W	100µsec	11,000 µF	- 5%
2000W	100µsec	18,000 µF	- 5%

Assumption:

Starting power = 1200W; step up to peak power at a rate of 0.5A/µsec

Ithrottle trip threshold assumed to be 140.8A

9.4 Peak load support testing with system bulk capacitance

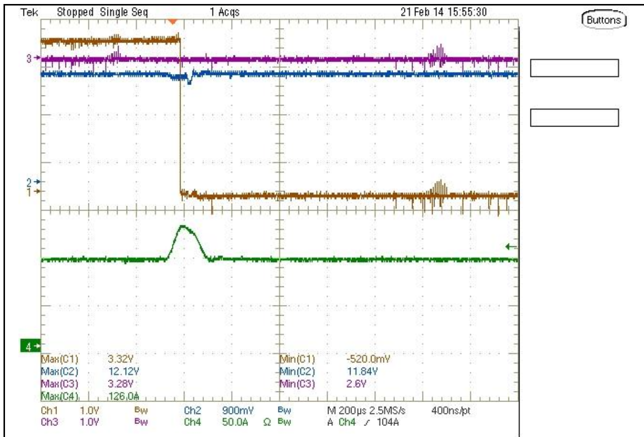
Test conditions:

Sample NO.1

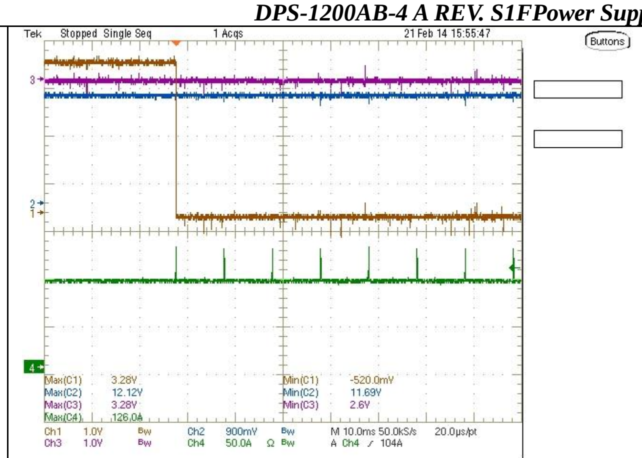
AMB. 25℃

Graphical Result: PASS

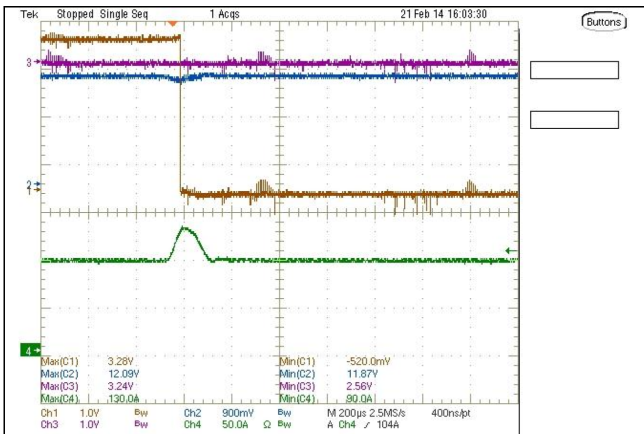
	SMB Alert		+12Vsb		PW_OK		
Test Condition	Max(V)	Min(V)	Max(V)	Min(V)	Max(V)	Min(V)	Result
+12V Peak load O/P: 98A to 1600W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap	3.360	3.120	12.196	11.908	3.220	2.860	PASS
+12V Peak load O/P: 98A to 1600W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap	3.360	3.160	12.160	11.980	3.220	2.860	PASS
+12V Peak load O/P: 98A to 1800W +12Vsb 2A; I/P: 230Vac,O/P With Min F Cap	0.200	-0.280	12.196	11.872	3.220	2.820	PASS
+12V Peak load O/P: 98A to 1800W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap	3.320	-0.240	12.160	11.944	3.220	2.860	PASS
+12V Peak load O/P: 98A to 2000W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap	3.760	-0.600	12.232	11.836	3.220	2.860	PASS
+12V Peak load O/P: 98A to 2000W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap	3.480	-0.200	12.160	11.908	3.220	2.900	PASS
+12V Peak load O/P: 98A to 1600W +12Vsb 2A; I/P: 230Vac,O/P With 4000uF Cap	3.360	3.160	12.196	11.944	3.220	2.860	PASS
+12V Peak load O/P: 98A to 1600W +12Vsb 2A; I/P: 230Vac,O/P With 4000uF Cap	3.360	3.200	12.160	11.980	3.220	2.860	PASS
+12V Peak load O/P: 98A to 1800W +12Vsb 2A; I/P: 230Vac,O/P With 11000uF F Cap	0.200	-0.280	12.196	11.872	3.260	2.860	PASS
+12V Peak load O/P: 98A to 1800W +12Vsb 2A; I/P: 230Vac,O/P With 11000uF Cap	3.320	-0.240	12.160	11.944	3.220	2.860	PASS
+12V Peak load O/P: 98A to 2000W +12Vsb 2A; I/P: 230Vac,O/P With 18000uF Cap	0.160	-0.320	12.232	11.836	3.220	2.900	PASS
+12V Peak load O/P: 98A to 2000W +12Vsb 2A; I/P: 230Vac,O/P With 18000uF Cap	3.320	-0.240	12.160	11.908	3.220	2.900	PASS



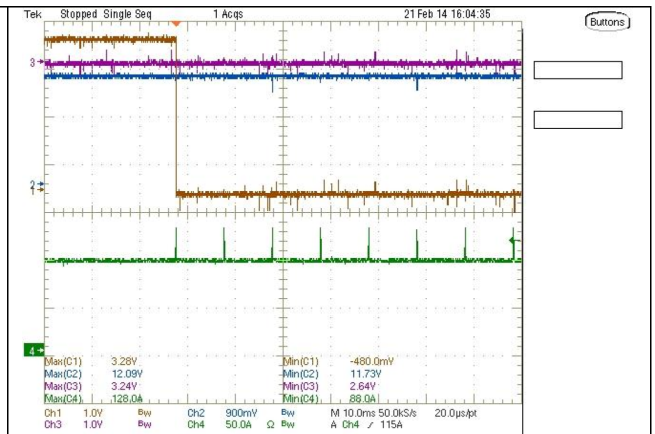
+12V Peak load O/P: 98A to 1600W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap
CH1: SMB Alert
CH2: 12V
CH3: PWOK
CH4: 12V Current



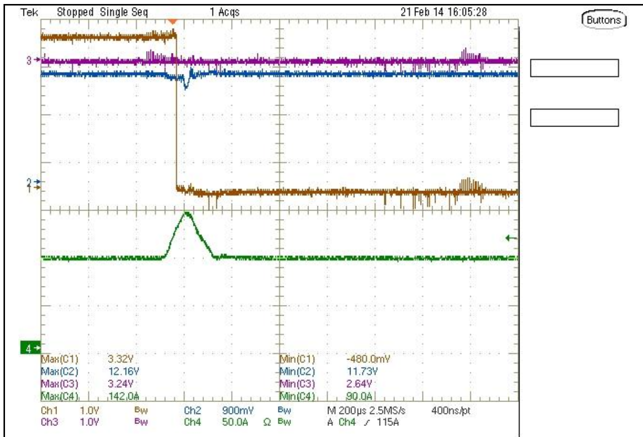
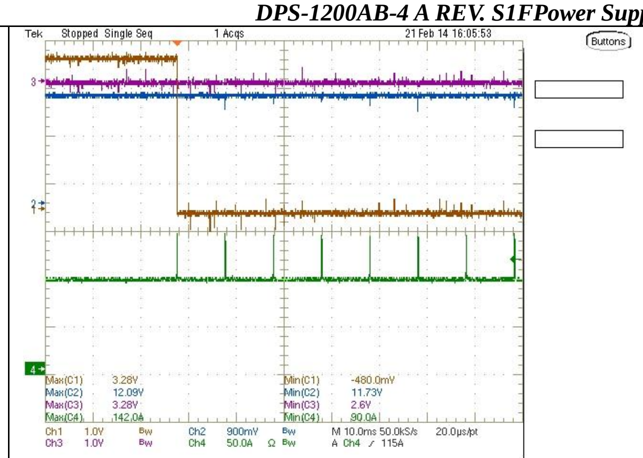
+12V Peak load O/P: 98A to 1600W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap
CH1: SMB Alert
CH2: 12V
CH3: PWOK
CH4: 12V Current

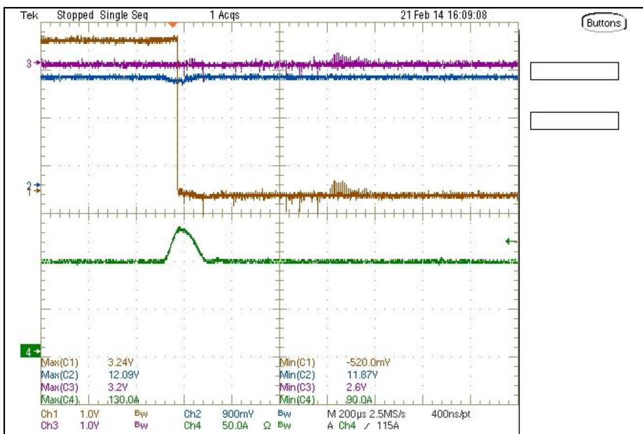
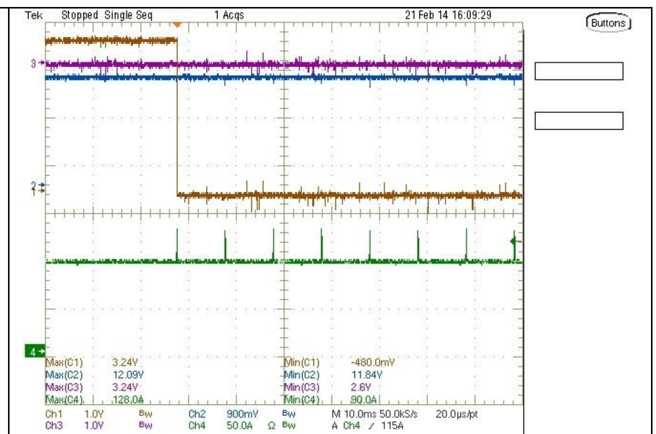


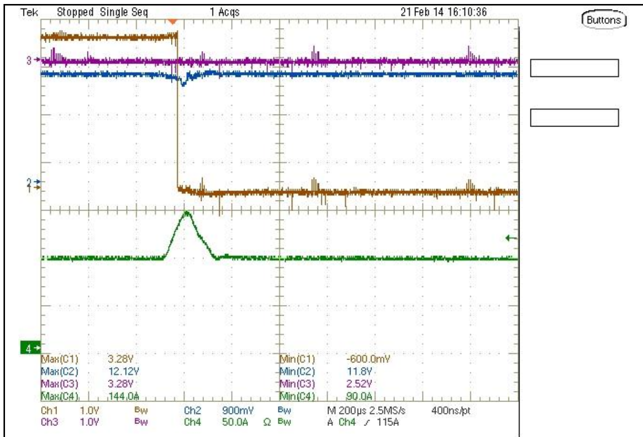
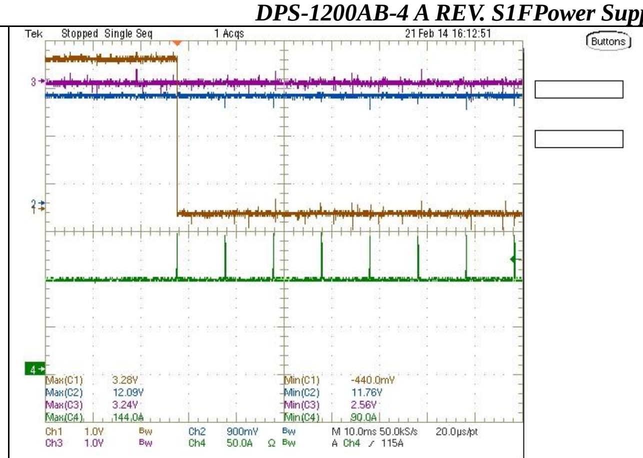
+12V Peak load O/P: 98A to 1800W +12Vsb 2A; I/P: 230Vac,O/P With Min F Cap
CH1: SMB Alert
CH2: 12V
CH3: PWOK
CH4: 12V Current

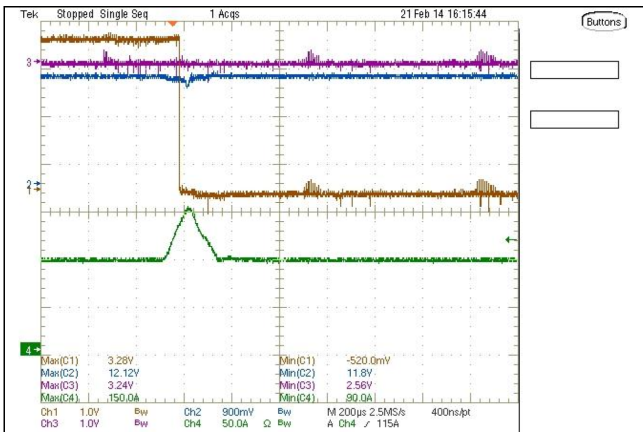
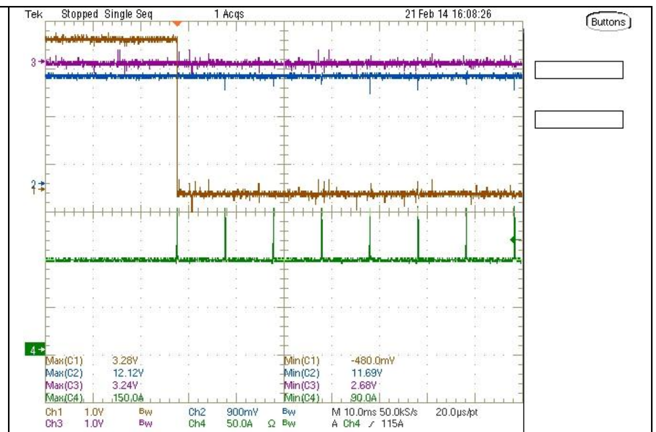


+12V Peak load O/P: 98A to 1800W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap
CH1: SMB Alert
CH2: 12V
CH3: PWOK
CH4: 12V Current

	
+12V Peak load O/P: 98A to 2000W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap CH1: SMB Alert CH2: 12V CH3: PWOK CH4: 12V Current	+12V Peak load O/P: 98A to 2000W +12Vsb 2A; I/P: 230Vac,O/P With Min Cap CH1: SMB Alert CH2: 12V CH3: PWOK CH4: 12V Current

	
+12V Peak load O/P: 98A to 1600W +12Vsb 2A; I/P: 230Vac,O/P With 4000uF Cap CH1: SMB Alert CH2: 12V CH3: PWOK CH4: 12V Current	+12V Peak load O/P: 98A to 1600W +12Vsb 2A; I/P: 230Vac,O/P With 4000uF Cap CH1: SMB Alert CH2: 12V CH3: PWOK CH4: 12V Current

	
+12V Peak load O/P: 98A to 1800W +12Vsb 2A; I/P: 230Vac,O/P With 11000uF F Cap CH1: SMB Alert CH2: 12V CH3: PWOK CH4: 12V Current	+12V Peak load O/P: 98A to 1800W +12Vsb 2A; I/P: 230Vac,O/P With 11000uF Cap CH1: SMB Alert CH2: 12V CH3: PWOK CH4: 12V Current

	
+12V Peak load O/P: 98A to 2000W +12Vsb 2A; I/P: 230Vac,O/P With 18000uF Cap CH1: SMB Alert CH2: 12V CH3: PWOK CH4: 12V Current	+12V Peak load O/P: 98A to 2000W +12Vsb 2A; I/P: 230Vac,O/P With 18000uF Cap CH1: SMB Alert CH2: 12V CH3: PWOK CH4: 12V Current

9.5 Timing diagram for peak power support with throttling

Below is the peak load profile the system applies to the PSU for a high peak power levels that represent a virus condition. Under this condition the PSU will assert the fast SMBAlert signal to quickly bring down the system power by throttling processors performance.

SMBAlert shall asset while hit fold back level to guarantee Pmax levels will be shortened to < 100µsec (system PID control).

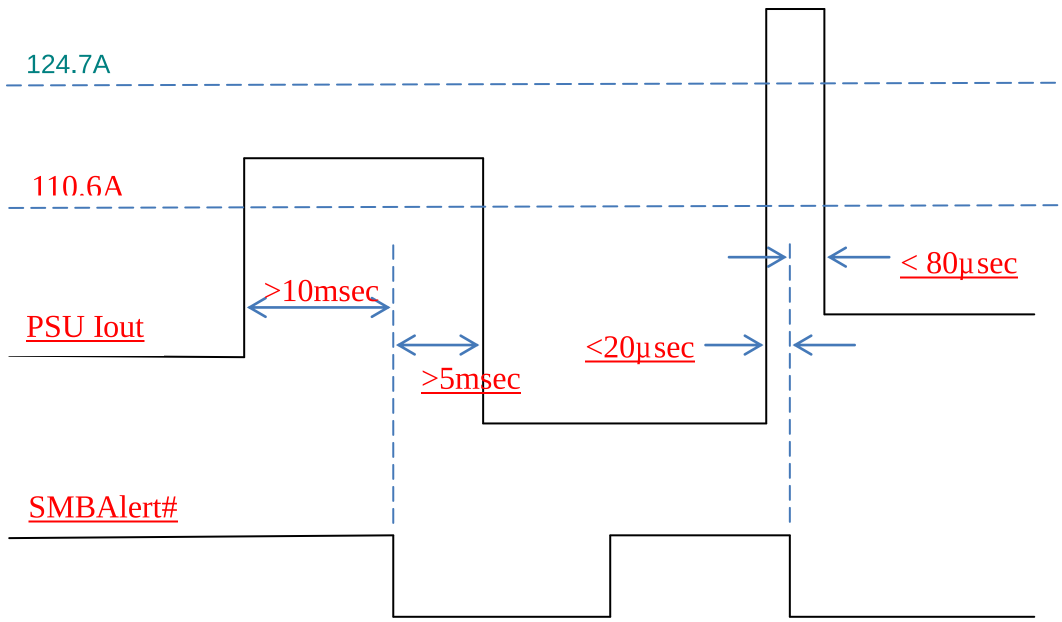


Figure 3: PSU load vs Time (throttling mode)

* TBD is reserved define range which depend on PSU real test result.

10. LED Indicator

There is one bicolor LED located at the front side (ac input side) of the power supply, which shows the status of the power supply.

10.1 Indication Matrix

Table 23 Indication matrix

	Bicolor	
Power Supply Condition	**GREEN LED**	**AMBER LED**
No AC power to all power supplies	OFF	OFF
Power supply critical event causing a shutdown; failure, OCP, OVP, Fan Fail, OTP, UVP	OFF	AMBER
Power supply warning events where the power supply continues to operate; high temp (inlet temperature >54deg(PMBus reading), or hot spot temperature >105deg(PMBus reading)), high power, high current, slow fan (<1200rpm).	OFF	0.5Hz Blink AMBER
AC present Only 12VSB on (PS off) or PS in Smart Redundant state	0.5Hz Blink GREEN	OFF
Output ON and OK	ON	OFF
AC cord unplugged	OFF	AMBER
FW update mode	2Hz Blink GREEN	OFF

* It is just nominal value, the actual value will related with component tolerance.

Test Result: PASS

11. PMBus

11.1 Electrical Layer

The PMBus electrical driving levels shall comply with high power DC specifications given in Section 3.1.3. of SMBus Specification version 2.0

11.2 FRU Data Format

For identification of the power supply an internal 256x8 bit EEPROM with PMBus interface is used. The information in the EEPROM follows the IPMI (Platform Management FRU Information Storage Definition) guidelines Document Revision 1.1 from November 15, 1999 and Siemens Norm SN77250

11.3 FRU Signals

Four pins will be allocated for the FRU information on the Power Supply connector. One pin is the serial clock (SCL). The second pin is used for serial data (SDA). ~~Three~~ Two pins are for address lines A0-A1 to indicate to the power supply's EEPROM which position the power supply is located in the system. The SCL and SDA signals are pulled up by system, the address lines are also pulled up by system.

Table 34: FRU Signals

A1	A0	EEPROM	μP	PSU
0	0	A0	B0	1
0	1	A2	B2	2
1	0	A4	B4	3
1	1	A6	B6	4

Test Result: PASS

11.4 PMBus Command Set

Via the PMBus the computer system can communicate with the power supply to access currents, voltages, fan control and speed and temperatures. The communication follows the Power System Management Protocol Specification. (PMBus 1.2) As soon as AC Power is connected to the PSU the PMBus functionality must be available.

Following Table shows mandatory PMBus commands to be supported by the PSU.

Table 25: Supported PMBus Command Set

Command Code	Primergy Commands	Read/Write R/W	Number of Data Bytes	Limits 1200W(Platinum)	Comment
01h	OPERATION	R/W	1		Default 0b00000000
02h	ON_OFF_CONFIG	R/W	1		Default 0b00010101
03h	CLEAR_FAULT	Send Byte	0		
05h	PAGE_PLUS_WRITE	Block W			
06h	PAGE_PLUS_READ	BW-BR process call			
19h	CAPABILITY	R	1		90h
1Ah	QUERY	BW-BR process call			
1Bh	SMBALERT_MASK	BW-BR process call			
20h	VOUT_MODE	R/W	1		17h (n=-9)
30h	COEFFICIENT (used for READ_EIN,READ_EOUT)	BW-BR process call	5		M=01h, b=00h, R=00h
3Ah	FAN_CONFIG_1_2	R/W	1		Fan 1 is commanded in duty
3Bh	FAN_COMMAND_1	R/W	2		
4Ah	IOUT_OC_WARN_LIMIT	R/W	2	86.92A/103.88A	Low line / High line 106%
51h	OT_WARN_LIMIT	R/W	2	105℃	Hotspot warning limit
5Dh	IIN_OC_WARN_LIMIT	R/W	2	16.0A/9.6A	Low line / High line ~130%
6Ah	POUT_OP_WARN_LIMIT	R/W	2	1300W/ 1560W	Low line / High line ~130%
6Bh	PIN_OP_WARN_LIMIT	R/W	2	1380W/1620W	Low line / High line ~130%
79H	STATUS_WORD	R	2		
(Low)7	BUSY				Not used
6	OFF				OFF = 1 when PWOK = 0 OFF = 0 when PWOK = 1
5	VOUT_OV_FAULT				
4	IOUT_OC				
3	VIN_UV				
2	TEMPERATURE				
1	CML				
0	NON OF THE ABOVE				If any 79h high byte bit asserted, NONE OF ABOVE assert 1.
(High)7	VOUT				
6	IOUT/POUT				
5	INPUT				
4	MFR_SPECIFIC				Not used
3	POWER_GOOD				POWER_GOOD = 1 when PWOK =0 POWER_GOOD = 0 when PWOK =1
2	FANS				
1	OTHER				Not used
0	UNKNOWN				Not used
7Ah	STATUS_VOUT	R	1		
7	VOUT_OV_FAULT			13.75V	VOUT_OV_FAULT bit assert at 13.75V

4	VOUT_UV_FAULT			10.5V	VOUT_UV_FAULT bit assert at 10.5V
7Bh	STATUS_IOUT	R	1		
7	Iout OC fault			92.66A/110.74A	Iout OC fault bit assert at 113% of full load
5	Iout OC warning			86,92A/103.88A	Iout OC warning bit assert at 106% of full load
1	Pout OP fault			1400W/1680W	Pout OP fault bit assert at 140% of full load
0	Pout OP warning			1300W/ 1560W	Pout OP warning bit assert at 130% of full load
7Ch	STATUS_INPUT	R	1		
5	Vin UV warning			82V+/-2V	Vin UV warning bit assert if input is lower than 82V (may have +-2V tolerence)
4	Vin UV fault			75V+4/-5V	Vin UV fault bit assert if input is lower than 75V (may have +4/-5V tolerence)
3	Unit off for insufficient input				
1	Iin OC warning			16.0A/9.6A	Iin OC warning bit assert at 130% of full load
0	Pin OP warning			1380W/1620W	Pin OP warning bit assert at 130% of full load
7Dh	STATUS_TEMPERATURE	R	1		
7	OT fault			58˚C+-2℃ /110˚C+-2℃	OT fault bit assert at 58+-2℃ (inlet)/110˚ C+-2℃(hotspot)
6	OT warning			54˚C+-2℃ / 105˚C+-2℃	OT warning bit assert at 54+-2℃ (inlet)/105˚ C+-2℃(hotspot)
7Eh	STATUS_CML	R	1		
7	Command fault				
6	Data fault				
5	PEC fault				
81h	STATUS_FANS_1_2	R	1		
7	Fan 1 fault			800rpm	Fan 1 fault bit assert when speed is less 800rpm
6	Fan 2 fault			0	No fan2
5	Fan1 warning			1200rpm	Fan 1 warning bit assert when speed is less 1200rpm
4	Fan2 warning			0	No fan2
3	Fan1 speed overridden			0	Always 0
2	Fan2 speed overridden			0	No fan2
86h	READ_EIN	Block R	6		
87h	READ_EOUT	Block R	6		
88h	READ_VIN	R	2		
89h	READ_IIN	R	2		
8Bh	READ_VOUT	R	2		
8Ch	READ_IOUT	R	2		
8Dh	READ_TEMPERATURE_1	R	2		Ambient
8Eh	READ_TEMPERATURE_2	R	2		Hotspot
8Fh	READ_TEMPERATURE_3	R	2		outlet
90h	READ_FAN_SPEED_1	R	2		In rpm
96h	READ_POUT	R	2		
97h	READ_PIN	R	2		
98h	PMBUS_REVISION	R	1	22h	PMBus 1.2

99h	MFR_ID	Block R	5	„DELTA“	
9Ah	MFR_MODEL	Block R	Variable		"DPS-1200B-4 A"
9Bh	MFR_REVISION	Block R	3	„XXF“	By stage
9Ch	MFR_LOCATION	Block R	5	„CHINA“	
9Dh	MFR_DATE	Block R	6	„YYMMDD“	
9Eh	MFR_SERIAL	Block R	14		Serial Number
9Fh	APP_PROFILE_SUPPORT	R	1	04h	from Intel's definition
A0h	MFR_VIN_MIN	R	2	90V	
A1h	MFR_VIN_MAX	R	2	264V	
A2h	MFR_IIN_MAX	R	2	7.08A/12.47A	Low line / High line
A3h	MFR_PIN_MAX	R	2	1185W/1345W	Low line / High line
A4h	MFR_VOUT_MIN	R	2	11.4V	="-5% value"
A5h	MFR_VOUT_MAX	R	2	12.6V	="+5% value"
A6h	MFR_IOUT_MAX	R	2	82A/98A	Low line / High line
A7h	MFR_POUT_MAX	R	2	1000W/1200W	Low line / High line
A8h	MFR_TAMBIENT_MAX	R	2	50℃	Max operating temperature
A9h	MFR_TAMBIENT_MIN	R	2	0℃	Min operating temperature
ABh	MFR_EFFICIENCY_HL	R	14	90%/94%/91%	At 20%/50%/100% load
C0h	MFR_MAX_TEMP_1	R	2	54℃	Warning for Ambient
C1h	MFR_MAX_TEMP_2	R	2	105℃	Warning for Hotspot
D0h	SMART_ON_CONFIG	R/W	1		
D4h	MFR_HW_COMPATIBILITY	R	2		
D5h	MFR_FWUPLOAD_CAPABILITY	R	1		
D6h	MFR_FWUPLOAD_MODE	R/W	1		
D7h	MFR_FWUPLOAD	Block W	Variable		
D8h	MFR_FWUPLOAD_STATUS	R	2		
D9h	MFR_FW_REVISION	Block R	3		
DCh	MFR_BLACKBOX	Block R	237		
DDh	MFR_REAL_TIME_BLACK_BOX	Block R/W	4		
DEh	MFR_SYSTEM_BLACK_BOX	Block R/W	40		
E0h	MFR_CLEAR_BLACKBOX	Send byte	0		
E1h	MFR_FAN_WARNING_LIMIT	R/W	2	1200rpm	For fan waring testing Linear data
E2h	FRU_EEPROM_WRITE_PROT	R/W	1		80h= FRU write enable 00h= FRU write disable
E3h	MFR_PRIMARY_REVISION	Block R	4		04h 31h 2Eh 30h 37h means 1.07
E4h	MFR_SECONDARY_REVISION	Block R	4		04h 31h 2Eh 30h 37h means 1.07
E9h	MFR_ICURRENT_SLEEP	Variable			For sleep current debug function
EAh	MFR_ICURRENT_WAKE	Variable			For wake current debug function
EBh	MFR_TSLEEP_LATENCY	Variable			For sleep time debug function
ECh	MFR_ISHARE	Variable			For current share debug
F0-FFh	CALIBRATION_DEBUG	Variable			For calibration and debug

11.4 PMBus Command Set

Test conditions:

Sample NO.1

AMB. 25℃

Input Voltage: 180Vac/60Hz

Output Load: PS_OFF, Standby Mode, 12Vsb/0A

Item	Command Code	Data SPEC High Line	Query Byte	# of Protocol	# of Bytes	Data Value Low / High Btye
PAGE	00h	FF	00	3	1	TBD
OPERATION	01h	00	00	3	1	00
ON_OFF_CONFIG	02h	15	00	3	1	15
PAGE_PLUS_READ	06h	40/08	BC	8	3	40/08
CAPABILITY	19h	90	BC	3	1	90
SMBALERT_MASK	1Bh	FF	FC	8	2	FF
VOUT_MODE	20h	17	BC	3	1	17
COEFFICIENT	30h	05 / 01 / 00 / 00 / 00 / 00	BC	8	6	05 / 01 / 00 / 00 / 00 / 00
FAN_CONFIG_1_2	3Ah	90	FC	3	1	D5
FAN_COMMAND_1	3Bh	00/00	E0	5	2	00/20
VOUT_OV_FAULT_LIMIT	40h	80/1C	E0	5	2	80/1C
VOUT_UV_FAULT_LIMIT	44h	80/15	E0	5	2	80/15
IOUT_OC_FAULT_LIMIT	46h	88/EB	A0	5	2	88/EB
IOUT_OC_WARN_LIMIT	4Ah	30/EB	E0	5	2	30/EB
OT_WARN_LIMIT	51h	D2/00	E0	5	2	3B/00
IIN_OC_FAULT_LIMIT	5Bh	06/D2	E0	5	2	06/D2
IIN_OC_WARN_LIMIT	5Dh	73/DA	E0	5	2	76/DA
POUT_OP_FAULT_LIMIT	68h	D0/0A	E0	5	2	D0/0A
POUT_OP_WARN_LIMIT	6Ah	76/0A	E0	5	2	76/0A
PIN_OP_WARN_LIMIT	6Bh	AC/0A	E0	5	2	AC/0A
STATUS_BYTE	78h	40	BC	3	1	40
STATUS_WORD	79h	40/08	BC	5	2	40/08
STATUS_VOUT	7Ah	00	FC	3	1	00
STATUS_IOUT	7Bh	00	FC	3	1	00
STATUS_INPUT	7Ch	00	FC	3	1	00
STATUS_TEMPERATURE	7Dh	00	FC	3	1	00
STATUS_CML	7Eh	00	FC	3	1	00
STATUS_OTHER	7Fh	00	FC	3	1	00
STATUS_FANS_1_2	81h	00	FC	3	1	00

11.4 PMBus Command Set

Test conditions:

Sample NO.1

AMB. 25℃

Input Voltage: 180Vac/60Hz

Output Load: PS_OFF, Standby Mode, 12Vsb/0A

Item	Command Code	Data SPEC High Line	Query Byte	# of Protocol	# of Bytes	Data Value Low / High Btye
READ_EIN	86h	06/ xx/ xx xx/ xx/ xx/ xx	AC	7	7	06 / 00 / 00 / 00 / 00 / 00 / 00
READ_EIN	87h	06/ xx/ xx xx/ xx/ xx/ xx	AC	7	7	06 / 00 / 00 00 / 00 / 00 /00
READ_VIN	88h	xx/Fx	A0	5	2	CE/F2
READ_IIN	89h	xx/B8	A0	5	2	4A/B8
READ_VOUT	8Bh	00/00	A0	5	2	00/00
READ_IOUT	8Ch	00/00	A0	5	2	00/00
READ_TEMPERATURE_1	8Dh	xx/00	A0	5	2	1B/00
READ_TEMPERATURE_2	8Eh	xx/00	A0	5	2	23/00
READ_TEMPERATURE_3	8Fh	xx/00	A0	5	2	BB/00
READ_FAN_SPEED_1	90h	xx/20	A0	5	2	00/20
READ_POUT	96h	00/00	A0	5	2	00/00
READ_PIN	97h	xx/F0	A0	5	2	07/F0
PMBUS_REVISION	98h	22	BC	3	1	22
MFR_ID	99h	05 / 44 / 45 / 4C / 54 / 41	BC	7	6	05 / 44 / 45 / 4C / 54 / 41
MFR_MODEL	9Ah	0E / 44 / 50 / 53 2D / 31 / 32 / 30 30 / 41 / 42 / 2D 32 / 20 / 41	BC	7	15	0E / 44 / 50 / 53 2D / 31 / 32 / 30 30 / 41 / 42 / 2D 32 / 20 / 41
MFR_REVISION	9Bh	03 / 53 / 31 / 46	BC	7	4	03 / 53 / 31 / 46
MFR_LOCATION	9Ch	05 / 43 / 48 / 49 / 4E / 41	BC	7	6	05 / 43 / 48 / 49 / 4E / 41
MFR_Data	9Dh	06 / 31 / 33 / 30 35 / 32 / 32	BC	7	7	06 / 31 / 33 / 30 35 / 32 / 32
APP_PROFILE_SUPPORT	9Fh	04	BC	3	1	02

11.4 PMBus Command Set

Test conditions:

Sample NO.1

AMB. 25℃

Input Voltage: 180Vac/60Hz

Output Load: PS_OFF, Standby Mode, 12Vsb/0A

Item	Command Code	Data SPEC High Line	Query Byte	# of Protocol	# of Bytes	Data Value Low / High Btye
MFR_VIN_MIN	A0h	5A/00	A0	5	2	5A/00
MFR_VIN_MAX	A1h	08/01	A0	5	2	08/01
MFR_IIN_MAX	A2h	4C/CB	A0	5	2	4C/CB
MFR_PIN_MAX	A3h	38/05	A0	5	2	38/05
MFR_VOUT_MIN	A4h	CD/16	A0	5	2	CD/16
MFR_VOUT_MAX	A5h	33/19	A0	5	2	33/19
MFR_IOUT_MAX	A6h	90/F1	A0	5	2	90/F1
MFR_POUT_MAX	A7h	20/03	A0	5	2	B0/04
MFR_TAMBIENT_MAX	A8h	37/00	A0	5	2	37/00
MFR_TAMBIENT_MIN	A9h	0A/00	A0	5	2	0A/00
MFR_EFFICIENCY_LL	AAh	12 / 73 / 00 / 78	BC	7	18	12 / 73 / 00 / 78
		00 / 53 / 00 / F0				00 / 53 / 00 / F0
		00 / 58 / 00 / 58				00 / 58 / 00 / 58
		02 / 5B / 00 / B0				02 / 5B / 00 / B0
		04 / 59 / 00 / 72				04 / 59 / 00 / 71
MFR_EFFICIENCY_HL	ABh	12 / E6 / 00 / 78	BC	7	18	12 / E6 / 00 / 78
		00 / 55 / 00 / F0				00 / 55 / 00 / F0
		00 / 5A / 00 / 58				00 / 5A / 00 / 58
		02 / 5E / 00 / B0				02 / 5E / 00 / B0
		04 / 5C / 00 / BE				04 / 5C / 00 / BE
MFR_MAX_TEMP_1	C0h	3B / 00	A0	5	2	3B/00
MFR_MAX_TEMP_2	C1h	5F / 00	A0	5	2	5F/00
LPO_CONFIG	D2h	00	FC			00
MFR_TAMBIENT_MAX_1	D3h	3B/00	A0	5	2	3B/00
MFR_TEMP2_MAX	D4h	5F/00	A0	5	2	5F/00
READ_FAN_CURRENT	D5h	xx/xx	A0	5	2	05/B8
FIRMWARE_REVISION	D7h	08/xx/xx/xx/	BC	7	9	08 / 30 / 31 / 2E
		xx/xx/xx/xx/				30 / 30 / 2E / 30
		xx				34
SMART_ON_CONFIG	DEh	00	FC	3	1	00
PIN_OP_FAULT_LIMIT	DFh	0C/0B	E0	5	2	0C/0B
APP_PROFILE_SUPPORT	E1h	xx/xx	A0	5	2	A5/9B
ERROR_LED_ON_OFF	E3h	00h	FC	3	1	00

11.4 PMBus Command Set

Test conditions:

Sample NO.1

AMB. 25℃

Input Voltage: 180Vac/60Hz

Output Load: +12V/1A, 12Vsb/0A

Item	Command Code	Data SPEC High Line	Query Byte	# of Protocol	# of Bytes	Data Value Low / High Btye
PAGE	00h	FF	00	3	1	TBD
OPERATION	01h	00	00	3	1	00
ON_OFF_CONFIG	02h	15	00	3	1	15
PAGE_PLUS_READ	06h	00/00	BC	8	3	00/00
CAPABILITY	19h	90	BC	3	1	90
SMBALERT_MASK	1Bh	FF	FC	8	2	FF
VOUT_MODE	20h	17	BC	3	1	17
COEFFICIENT	30h	05 / 01 / 00 / 00 / 00 / 00	BC	8	6	05 / 01 / 00 / 00 / 00 / 00
FAN_CONFIG_1_2	3Ah	90	FC	3	1	D5
FAN_COMMAND_1	3Bh	00/00	E0	5	2	00/20
VOUT_OV_FAULT_LIMIT	40h	80/1C	E0	5	2	80/1C
VOUT_UV_FAULT_LIMIT	44h	80/15	E0	5	2	80/15
IOUT_OC_FAULT_LIMIT	46h	88/EB	A0	5	2	88/EB
IOUT_OC_WARN_LIMIT	4Ah	30/EB	E0	5	2	30/EB
OT_WARN_LIMIT	51h	D2/00	E0	5	2	3B/00
IIN_OC_FAULT_LIMIT	5Bh	06/D2	E0	5	2	06/D2
IIN_OC_WARN_LIMIT	5Dh	73/DA	E0	5	2	76/DA
POUT_OP_FAULT_LIMIT	68h	D0/0A	E0	5	2	D0/0A
POUT_OP_WARN_LIMIT	6Ah	76/0A	E0	5	2	76/0A
PIN_OP_WARN_LIMIT	6Bh	AC/0A	E0	5	2	AC/0A
STATUS_BYTE	78h	00	BC	3	1	00
STATUS_WORD	79h	00/00	BC	5	2	00/00
STATUS_VOUT	7Ah	00	FC	3	1	00
STATUS_IOUT	7Bh	00	FC	3	1	00
STATUS_INPUT	7Ch	00	FC	3	1	00
STATUS_TEMPERATURE	7Dh	00	FC	3	1	00
STATUS_CML	7Eh	00	FC	3	1	00
STATUS_OTHER	7Fh	00	FC	3	1	00
STATUS_FANS_1_2	81h	00	FC	3	1	00

11.4 PMBus Command Set

Test conditions:

Sample NO.1

AMB. 25℃

Input Voltage: 180Vac/60Hz

Output Load: +12V/1A, 12Vsb/0A

Item	Command Code	Data SPEC High Line	Query Byte	# of Protocol	# of Bytes	Data Value Low / High Btye
READ_EIN	86h	06/ xx/ xx xx/ xx/ xx/ xx	AC	7	7	06 / 0F / 05 / 00 / 32 / 00 / 00
READ_EIN	87h	06/ xx/ xx xx/ xx/ xx/ xx	AC	7	7	06 / 79 / 02 00 / 32 / 00 /00
READ_VIN	88h	xx/Fx	A0	5	2	CF/F2
READ_IIN	89h	xx/B8	A0	5	2	7F/B8
READ_VOUT	8Bh	xx/xx	A0	5	2	87/18
READ_IOUT	8Ch	xx/xx	A0	5	2	84/C8
READ_TEMPERATURE_1	8Dh	xx/00	A0	5	2	1A/00
READ_TEMPERATURE_2	8Eh	xx/00	A0	5	2	20/00
READ_TEMPERATURE_3	8Fh	xx/00	A0	5	2	BB/00
READ_FAN_SPEED_1	90h	xx/2x	A0	5	2	CE/22
READ_POUT	96h	xx/xx	A0	5	2	38/D3
READ_PIN	97h	xx/F0	A0	5	2	7E/F0
PMBUS_REVISION	98h	22	BC	3	1	22
MFR_ID	99h	05 / 44 / 45 / 4C / 54 / 41	BC	7	6	05 / 44 / 45 / 4C / 54 / 41
MFR_MODEL	9Ah	0E / 44 / 50 / 53 2D / 31 / 32 / 30 30 / 41 / 42 / 2D 32 / 20 / 41	BC	7	15	0E / 44 / 50 / 53 2D / 31 / 32 / 30 30 / 41 / 42 / 2D 32 / 20 / 41
MFR_REVISION	9Bh	03 / 53 / 31 / 46	BC	7	4	03 / 53 / 31 / 46
MFR_LOCATION	9Ch	05 / 43 / 48 / 49 / 4E / 41	BC	7	6	05 / 43 / 48 / 49 / 4E / 41
MFR_Data	9Dh	06 / 31 / 33 / 30 35 / 32 / 32	BC	7	7	06 / 31 / 33 / 30 35 / 32 / 32
APP_PROFILE_SUPPORT	9Fh	04	BC	3	1	02

11.4 PMBus Command Set

Test conditions:

Sample NO.1

AMB. 25℃

Input Voltage: 180Vac/60Hz

Output Load: +12V/1A, 12Vsb/0A

Item	Command Code	Data SPEC High Line	Query Byte	# of Protocol	# of Bytes	Data Value Low / High Btye
MFR_VIN_MIN	A0h	5A/00	A0	5	2	5A/00
MFR_VIN_MAX	A1h	08/01	A0	5	2	08/01
MFR_IIN_MAX	A2h	4C/CB	A0	5	2	4C/CB
MFR_PIN_MAX	A3h	38/05	A0	5	2	38/05
MFR_VOUT_MIN	A4h	CD/16	A0	5	2	CD/16
MFR_VOUT_MAX	A5h	33/19	A0	5	2	33/19
MFR_IOUT_MAX	A6h	90/F1	A0	5	2	90/F1
MFR_POUT_MAX	A7h	20/03	A0	5	2	B0/04
MFR_TAMBIENT_MAX	A8h	37/00	A0	5	2	37/00
MFR_TAMBIENT_MIN	A9h	0A/00	A0	5	2	0A/00
MFR_EFFICIENCY_LL	AAh	12 / 73 / 00 / 78	BC	7	18	12 / 73 / 00 / 78
		00 / 53 / 00 / F0				00 / 53 / 00 / F0
		00 / 58 / 00 / 58				00 / 58 / 00 / 58
		02 / 5B / 00 / B0				02 / 5B / 00 / B0
		04 / 59 / 00 / 72				04 / 59 / 00 / 71
MFR_EFFICIENCY_HL	ABh	12 / E6 / 00 / 78	BC	7	18	12 / E6 / 00 / 78
		00 / 55 / 00 / F0				00 / 55 / 00 / F0
		00 / 5A / 00 / 58				00 / 5A / 00 / 58
		02 / 5E / 00 / B0				02 / 5E / 00 / B0
		04 / 5C / 00 / BE				04 / 5C / 00 / BE
MFR_MAX_TEMP_1	C0h	3B / 00	A0	5	2	3B/00
MFR_MAX_TEMP_2	C1h	5F / 00	A0	5	2	5F/00
LPO_CONFIG	D2h	00	FC			00
MFR_TAMBIENT_MAX_1	D3h	3B/00	A0	5	2	3B/00
MFR_TEMP2_MAX	D4h	5F/00	A0	5	2	5F/00
READ_FAN_CURRENT	D5h	xx/xx	A0	5	2	05/B8
FIRMWARE_REVISION	D7h	08/xx/xx/xx/	BC	7	9	08 / 30 / 31 / 2E
		xx/xx/xx/xx/				30 / 30 / 2E / 30
		xx				34
SMART_ON_CONFIG	DEh	00	FC	3	1	00
PIN_OP_FAULT_LIMIT	DFh	0C/0B	E0	5	2	0C/0B
APP_PROFILE_SUPPORT	E1h	xx/xx	A0	5	2	76/BA
ERROR_LED_ON_OFF	E3h	00h	FC	3	1	00

11.4.1 PMBus Temperature Read Commands

The following temperature read commands as documented by the PMBus specification Part II version 1.1 should be supported.

- READ_TEMPERATURE_1, should provide the PSU inlet temperature.
- READ_TEMPERATURE_2, should provide the temperature of the assumed hottest point in the PSU.
- READ_TEMPERATURE_3, should provide the PSU outlet temperature.

11.4.2 MFR_EFFICIENCY_HL

The MFR_EFFICIENCY_HL command sets or retrieves information about the efficiency of the device while operating at a high line condition. Not including the PEC byte, if used, and the byte count byte, there are fourteen data bytes as described below. The efficiency is specified at one input voltage and three data points consisting of output power and the efficiency at that output power. The three power ratings are typically referred as low, medium and high output power and are transmitted in that order. For example, the low, medium and high output power might correspond to 10%, 20%,50% and 100% of the rated output power. The exact values of the output power is specified is left to the PMBus device manufacturer. Each value (voltage, power or efficiency) is transmitted as two bytes in linear format.

Table 27:MFR_EFFICIENCY_HL

Byte Number	Byte Order	Description
0	Low Byte	The input voltage, in volts, at which the high line efficiency data is applicable. Note that byte 0 is the first data byte transmitted as part of the block transfer.
1	High Byte	
2	Low Byte	Power, in watts, at which the low power efficiency is specified
3	High Byte	
4	Low Byte	The efficiency, in percent, at the specified low power.
5	High Byte	
6	Low Byte	Power, in watts, at which the middle power efficiency is specified
7	High Byte	
8	Low Byte	The efficiency, in percent, at the specified middle power.
9	High Byte	
10	Low Byte	Power, in watts, at which the high power efficiency is specified
11	High Byte	
12	Low Byte	The efficiency, in percent, at the specified high power. Note that byte 13 is the last data byte transmitted as part of the block transfer.
13	High Byte	

11.4.3 PMBus Commands Preciseness and Data Format

For the following PMBus commands a minimum preciseness/accuracy for voltage, current and power readings and settings must be better than ±5% in the 10%-100% load range and must follow the tier 2 EPA for server guideline. The maximum deviation for the ambient temperature is ±3℃. Below 100W the maximum power deviation is ± 10W.

- READ_VIN
- READ_IIN
- READ_VOUT
- READ_IOUT
- READ_POUT
- READ_PIN

Table 28 : Power Measure Preciseness

	Pin<100W	**Pin>100W**
Pin, Pout	±10W	±5%
	< 10% of MAX LOAD	**> 10% of MAX LOAD**
Vin, Vout	±5%	±5%
Iout	±10% of the 10% load	±5%
	Iin: 0.25~1A	**Iin: >1A**
Iin	±0.05A	±5%

Preferred data format is the "Linear Data Format" as specified by PMBus specification Part II version 1.1.

For the following PMBus commands a minimum preciseness / accuracy for voltage, current and power readings and setting must be better than ±5% in the 10%-100% load range and must follow the tier 2 EPA for server guideline. The maximum deviation fir the ambient temperature is ±3℃. Below 100W the maximum power deviation is ±10W.

11.4.3 PMBus Commands Preciseness and Data Format

Test conditions:

Sample NO.1

AMB. 25℃

1. I/P V. I. P. reading and +12V O/P V. I. P. reading verify

STEP1 set AC source 180V/60Hz

STEP2: Load: +12Vsb@ 0A, +12V@ 2.45A (Load 2.5%)

STEP3: Use **Command 5: Read Word** read Command 8Bh, 8Ch and 96h of PS1

NO.	Test Item	Command	Data Requirement	Read Data	Equipment Data	Accuracy %
1	AC input voltage	88h	Meter reading +-1.25%	F2CEh	179.870Vac	-0.206%
2	AC input current	89h	Meter reading +-0.05A	B8A7h	0.314Arms	+0.012A
3	AC input power	97h	Meter reading +-5W	F0C3h	49.264W	-0.514W
4	+12V output voltage	8Bh	Load reading +-2%	187Fh	12.247V	+0.013%
5	+12V output current	8Ch	Load reading +-10%	C939h	2.467A	-0.899%
6	+12V output power	96h	Load reading +-12%	DBBEh	30.218W	-0.009%

STEP4: Load: Load: +12Vsb@ 0A, +12V@ 9.8A (Load 10%)

STEP5: Use **Command 5: Read Word** read Command 8Bh, 8Ch and 96h of PS1

NO.	Test Item	Command	Data Requirement	Read Data	Equipment Data	Accuracy %
1	AC input voltage	88h	Meter reading +-1.25%	F2CFh	179.86Vac	-0.061%
2	AC input current	89h	Meter reading +-0.05A	B990h	0.778Arms	+0.003A
3	AC input power	97h	Meter reading +-5W	F21Bh	136.231W	-1.481W
4	+12V output voltage	8Bh	Load reading +-2%	183Ch	12.109V	+0.068%
5	+12V output current	8Ch	Load reading +-5%	D273h	9.818A	-0.210%
6	+12V output power	96h	Load reading +-7%	EBB6h	118.880W	-0.109%

STEP6: Load: Load: +12Vsb@ 0A, +12V@ 19.6A (Load 20%)

STEP7: Use **Command 5: Read Word** read Command 8Bh, 8Ch and 96h of PS1

NO.	Test Item	Command	Data Requirement	Read Data	Equipment Data	Accuracy %
1	AC input voltage	88h	Meter reading +-1.25%	F2D0h	179.870Vac	+0.072%
2	AC input current	89h	Meter reading +-5%	BAEBh	1.459Arms	-0.001%
3	AC input power	97h	Meter reading +-3%	FA03h	258.771W	-0.491%
4	+12V output voltage	8Bh	Load reading +-2%	1843h	12.109V	+0.181%
5	+12V output current	8Ch	Load reading +-2%	DA73h	19.573A	+0.105%
6	+12V output power	96h	Load reading +-4%	F3B6h	237.011W	+0.206%

11.4.3 PMBus Commands Preciseness and Data Format

Test conditions:

Sample NO.1

AMB. 25℃

1. I/P V. I. P. reading and +12V O/P V. I. P. reading verify

Note1: Output voltage = +12V output voltage (from Register Address 8Bh) / 512

STEP8: Load: +12Vsb@ 0A, +12V@ 49A (Load 50%)

STEP9: Use **Command 5: Read Word** read Command 8Bh, 8Ch and 96h of PS1

NO.	Test Item	Command	Data Requirement	Read Data	Equipment Data	Accuracy %
1	AC input voltage	88h	Meter reading +-1.25%	F2D2h	179.860Vac	+0.356%
2	AC input current	89h	Meter reading +-5%	C38Ah	3.547Arms	-0.224%
3	AC input power	97h	Meter reading +-2%	027Ah	634.627W	-0.099%
4	+12V output voltage	8Bh	Load reading +-2%	184Bh	12.109V	+0.305%
5	+12V output current	8Ch	Load reading +-2%	E311h	48.964A	+0.202%
6	+12V output power	96h	Load reading +-4%	0251h	592.927W	+0.012%

STEP10: Load: +12Vsb@ 0A, +12V@ 98A (Load 100%)

STEP11: Use **Command 5: Read Word** read Command 8Bh, 8Ch and 96h of PS1

NO.	Test Item	Command	Data Requirement	Read Data	Equipment Data	Accuracy %
1	AC input voltage	88h	Meter reading +-1.25%	F2D6h	179.860Vac	+0.912%
2	AC input current	89h	Meter reading +-5%	CB9Bh	7.244Arms	-0.456%
3	AC input power	97h	Meter reading +-2%	0A8Bh	1299.947W	+0.158%
4	+12V output voltage	8Bh	Load reading +-2%	1869h	12.109V	+0.793%
5	+12V output current	8Ch	Load reading +-2%	EB11h	97.986A	+0.142%
6	+12V output power	96h	Load reading +-4%	0A50h	1186.508W	-0.211%

Test Result: PASS

11.4.3 PMBus Commands Preciseness and Data Format

Test conditions:

Sample NO.1

AMB. 25℃

INPUT: 180Vav/60Hz

Output Load: 12V/98A, +12Vsb/0A

Table 4 PMBus Addresses Table

A1/A0 setting	FRU Data EEPROM Address	uP Address
0/0	A0 / A1	B0 / B1
0/1	A2 / A3	B2 / B3
1/0	A4 / A5	B4 / B5
1/1	A6 / A7	B6 / B7

1. Set module@operate mode, AC I/P=180VAC/60Hz, Load 2.5%.
2. Use PMBus Read Word Protocol to read READ_VOUT.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
S	Slave Address	W	A	8BH	A	S	Slave Address	R	A	Byte Low	A	Byte High	A	PEC	NA	P

3. Convert data byte to voltage according PMBus VOUT data format.
4. Logging real voltage, Byte High and Byte Low.
5. +12V READ_VOUT accuracy should be +/-5%.
6. Repeat 2 ~ 6, for load: 10%, 20%, 50% and 100%; accuracy: 5%, 5%, 5%, 5%.

7. STEP1: AC I/P = 180VAC/60Hz, Load: +12VSB@ 1A, +12V@ 3A
8. STEP2: Use **Command 2: Write Byte** write 00h to address 04h
9. STEP3: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Eh

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	02/00h
2	STATUS_CML	7Eh	80h

10. STEP4: Use Send Byte(**Command 1**) to send CLEAR_FAULT
11.
12. **5.3.1.2 Data Fail test**
13. STEP5: Use **Command 2: Write Byte** write 01h to address 05h
14. STEP6: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Eh

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	02/00h
2	STATUS_CML	7Eh	40h

15. STEP7: Use Send Byte(**Command 1**) to send CLEAR_FAULT
16.
17. **5.3.1.3 PEC Fail test**
18. STEP8: Use **Command 2: Write Byte** write 00h to address 01h and PEC is 00h
19. STEP9: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h,7E and 00h

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	02/00h

2	STATUS_CML	7Eh	20h
3	OPERATION	01h	00

20. STEP10: Use Send Byte(**Command 1**) to send CLEAR_FAULT
21. STEP11: Use **Command 2: Write Byte** write 80h to address 01h with PEC.
22. STEP12: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Eh

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_CML	7Eh	00h

23. STEP13: PSOFF.

11.4.3 PMBus Commands Preciseness and Data Format

Test conditions:
Sample NO.1
AMB. 25℃
INPUT: 180Vav/60Hz
Output Load: 12V/98A, +12Vsb/0A

1. Set module@operate mode, AC I/P=180VAC/60Hz, Load 2.5%.
   2. Use PMBus Read Word Protocol to read READ_VOUT.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
S	Slave Address	W	A	8BH	A	S	Slave Address	R	A	Byte Low	A	Byte High	A	PEC	NA	P

   3. Convert data byte to voltage according PMBus VOUT data format.
   4. Logging real voltage, Byte High and Byte Low.
   5. +12V READ_VOUT accuracy should be +/-5%.
   6. Repeat 2 ~ 6, for load: 10%, 20%, 50% and 100%; accuracy: 5%, 5%, 5%, 5%.
7. STEP1: AC I/P = 180VAC/60Hz, Load: +12VSB@ 1A, +12V@ 3A
8. STEP2: Use **Command 2: Write Byte** write 00h to address 04h
9. STEP3: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Eh

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	02/00h
2	STATUS_CML	7Eh	80h

10. STEP4: Use Send Byte(**Command 1**) to send CLEAR_FAULT
11.
12. **5.3.1.2 Data Fail test**
13. STEP5: Use **Command 2: Write Byte** write 01h to address 05h
14. STEP6: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Eh

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	02/00h
2	STATUS_CML	7Eh	40h

15. STEP7: Use Send Byte(**Command 1**) to send CLEAR_FAULT
16.
17. **5.3.1.3 PEC Fail test**
18. STEP8: Use **Command 2: Write Byte** write 00h to address 01h and PEC is 00h
19. STEP9: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h,7E and 00h

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	02/00h
2	STATUS_CML	7Eh	20h
3	OPERATION	01h	00

20. STEP10: Use Send Byte(**Command 1**) to send CLEAR_FAULT
21. STEP11: Use **Command 2: Write Byte** write 80h to address 01h with PEC.
22. STEP12: Use **Command 5 and 3: Read Word and Read Byte,** read Address 79h and 7Eh

NO.	Test Item	Register Address	Data Byte
1	STATUS_WORD	79h	00/00h
2	STATUS_CML	7Eh	00h

23. STEP13: PSOFF.

Test Result: PASS