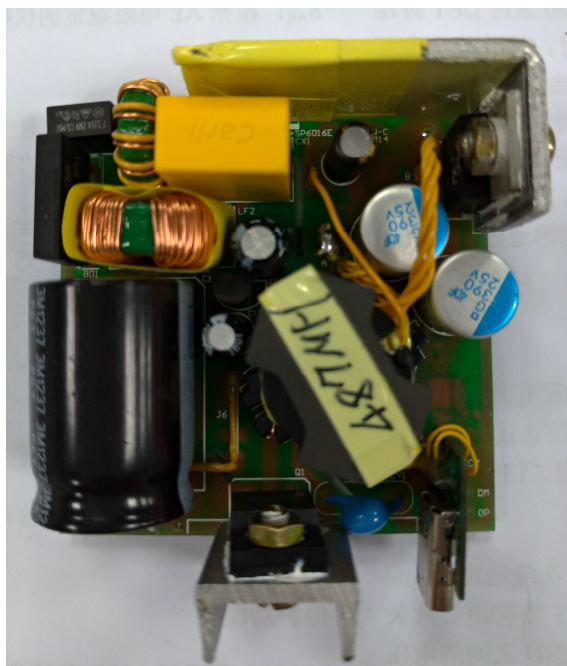




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45W PD Power Module Using UC3875A+VP300

UC3875A+VP300 45W PD Power EVB Manual



Key features:

- Compatible VIA PD protocol
- AC Input Full Range 90Vac~264Vac
- DC Output (Default voltage 5V)

5V	3 A
9V	3 A
12V	3 A
15V	3 A
20V	2.25 A

- Average Efficiency (Board end)

voltage	Test result		Level 6 Requirement
	@115VAC	@230VAC	
5V	87.69%	84.60%	81.39%
9V	89.22%	88.35%	86.62%
12V	89.58%	89.03%	87.40%
15V	89.43%	89.37%	87.73%
20V	88.86%	88.73%	87.73%

- Standby Power @230VAC
less than 100 mW
(Output voltage set to 5V)
- Over Load Protection
- Over Voltage Protection
- Short Circuit Protection

Revision History

Revise Date	Version	Reason/Issue	Remark
2018/8/30	A		S6003 S6006 VCRC 04



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1. Open Frame Module Specification

1.1. Input Characteristics

- AC input voltage range 90Vac ~ 264Vac
- AC input voltage rating 100Vac ~ 240Vac
- AC input frequency range 47Hz ~ 63Hz
- Input current 1A (rms)max. @ 90Vac/60Hz

1.2. Output Characteristics and Performance Specifications

Test Environment 25°C

● Output Voltage	5V	9V	12V	15V	20V
● Standby Power @230VAC (meet Level 6)	< 100mW	NA	NA	NA	NA
● Output Tolerance (%)	< ±10	< ±10	< ±10	< ±10	< ±10
● Minimum Load Current (A)	0	0	0	0	0
● Maximum Load Current (A)	3	3	3	3	2.25
● Maximum Output Power (Watt)	15	27	36	45	45
● Ripple and Noise (m Vp-p)	< 200	NA	< 200	NA	< 200
● Line Regulation (%)	<±1	NA	<±1	NA	<±1
● Load Regulation (%)	<±5	NA	<±5	NA	<±5
● Average Efficiency (meet Level 6)	81.39%	86.62%	87.40%	87.73%	87.73%

1.3. Protection Function

- Over Load Protection Shut down and auto recovery
- Over Voltage Protection Shut down and auto recovery
- Short Circuit Protection Shut down and auto recovery

1.4. Environment

- Operation Temperature 0°C to 40 °C
- Operation Humidity 20% to 90% R.H
- Storage Temperature -40°C to 60 °C
- Storage Humidity 0% to 90% R.H

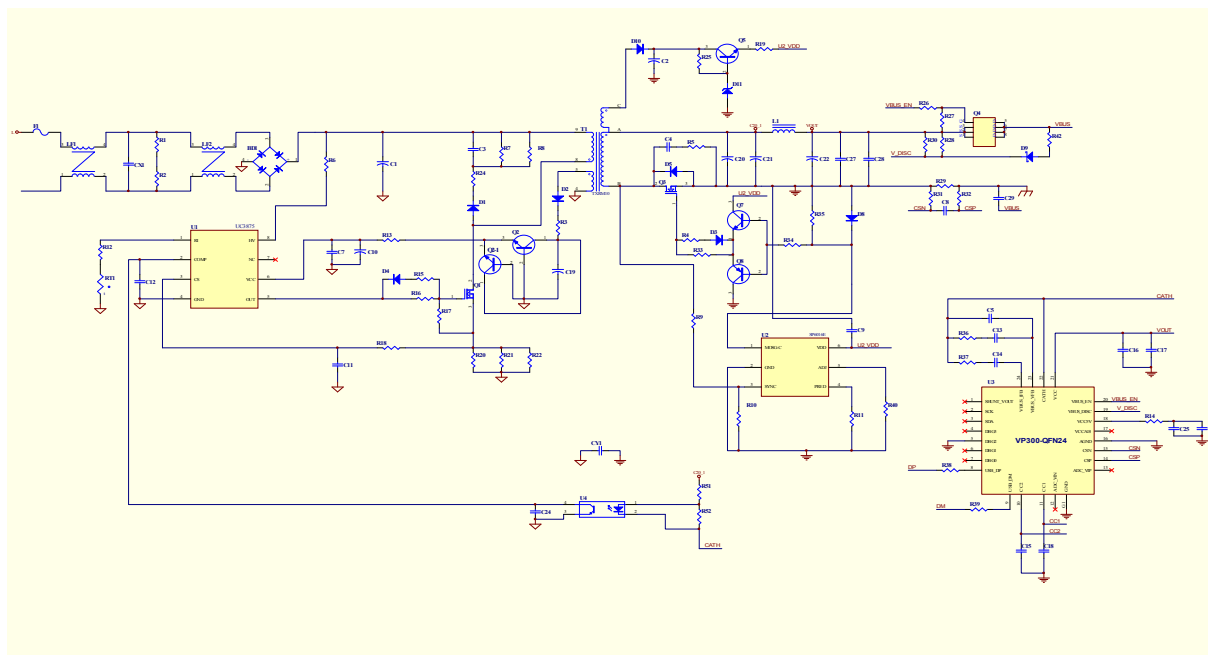


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2.1. Schematic



2.2. BOM

No.	Position	Description	Quantity
1	C15,C18	Capacitor, ceramic, 390pF/50V, X7R, SMD 0603	2
2	C13	Capacitor, ceramic, 10nF/50V, X7R, SMD 0603	1
3	C14	Capacitor, ceramic, 0.47uF/50V, X7R, SMD 0603	1
4	C5	Capacitor, ceramic, 0.22uF/50V, X7R, SMD 0805	1
5	C12	Capacitor, ceramic, 680pF/50V, X7R, SMD 0805	1
6	C8,C9	Capacitor, ceramic, 1uF/50V, X7R, SMD 0805	2
7	C11	Capacitor, ceramic, 470pF/50V, X7R, SMD 0805	1
8	C7	Capacitor, ceramic, 0.1uF/50V, X7R, SMD 0805	1
9	C3	Capacitor, ceramic, 1nF/1KV, X7R, SMD 1206	1
10	C4	Capacitor, ceramic, 2.2nF/1KV, X7R, SMD 1206	1
11	C16	Capacitor, ceramic, 1uF/50V, Y5U, SMD 1206	1
12	C27,C28	Capacitor, ceramic, 2.2uF/25V, X7R, SMD 1206	2
13	C29	Capacitor, ceramic, 2.2uF//2.2uF, X7R, SMD 1206	1
14	R27	Resistor, chip, 100K, 1/16W,±1%, SMD 0402	1
15	R11,R36	Resistor, chip, 47K, 1/10W,±1%, SMD 0603	2
16	R40	Resistor, chip, 200K, 1/10W,±1%, SMD 0603	1
17	R38,R39	Resistor, chip, 0R, 1/10W,±5%, SMD 0603	2
18	R26,R37	Resistor, chip, 1K, 1/10W,±1%, SMD 0603	2
19	R31,R32	Resistor, chip, 100R, 1/10W,±1%, SMD 0603	2
20	R51	Resistor, chip, 2K, 1/10W,±1%, SMD 0603	1
21	R52	Resistor, chip,4.3K, 1/10W,±1%, SMD 0603	1
22	R42	Resistor, chip, 300R, 1/8W,±1%, SMD 0805	1
24	R16,R33,R34	Resistor, chip, 10R, 1/8W,±1%, SMD 0805	3
25	R13,J8,J9,R15	Resistor, chip, 0R, 1/8W,±1%, SMD 0805	4
26	R18	Resistor, chip, 200R, 1/8W,±1%, SMD 0805	1

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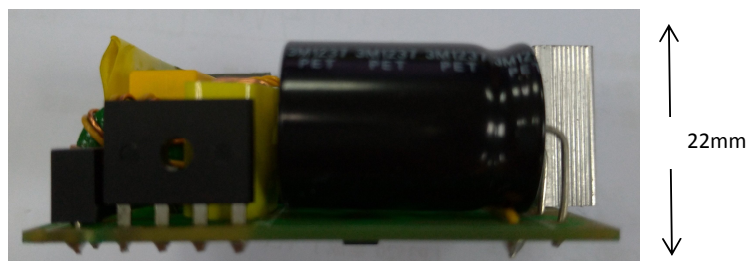
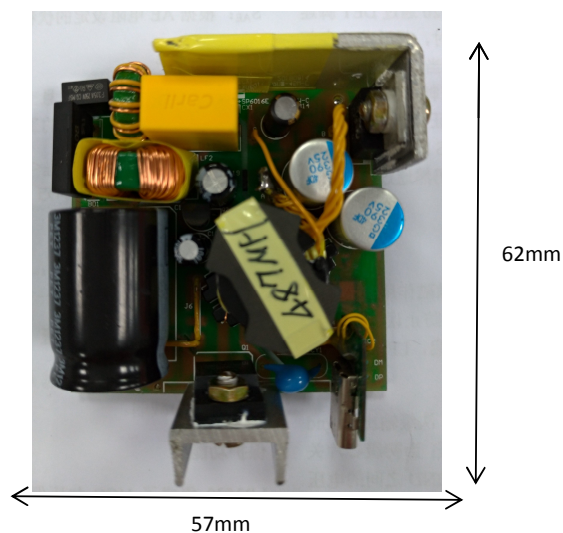
27	R17	Resistor, chip, 10K, 1/8W,±1%, SMD 0805	1
28	R25	Resistor, chip, 27K, 1/8W,±1%, SMD 0805	1
29	R10	Resistor, chip, 10K, 1/8W,±1%, SMD 0805	1
30	R1,R2	Resistor, chip, 1.5M, 1/4W,±1%, SMD 1206	2
31	R6	Resistor, chip, 510K, 1/4W,±1%, SMD 1206	1
32	R9	Resistor, chip, 16.2K, 1/4W,±1%, SMD 1206	1
33	R19	Resistor, chip, 4.7R, 1/4W,±1%, SMD 1206	1
34	R7,R8	Resistor, chip, 200K, 1/4W,±1%, SMD 1206	1
35	R5	Resistor, chip, 22R/22R, 1/4W,±1%, SMD 1206	1
36	R28	Resistor, chip, 22R, 1/4W,±1%, SMD 1206	1
37	R29	Resistor, chip, 10mR, 1/4W,±1%, SMD 1206	1
38	R13,R24,J1,J2,J3,J4,J10,J11	Resistor, chip, 0R, 1/4W,±5%, SMD 1206	8
39	R20	Resistor, chip, 1R, 1W,±1%, SMD 2512	1
40	R21	Resistor, chip, 1R, 1W,±1%, SMD 2512	1
41	D1	Diode ,standard recovery, 1N4007, 1.0A/1000V SMA	1
42	D11	Zener Diode ,12V, SOD-123	1
43	U4	IC, Opto-Coupler, LTV-357-T-B , SMD , LITE-ON	1
44	U2	IC, SP6016E , SOT-23-6L , SYNC POWER	1
45	U3	IC, VP300 , QFN24 , VIA	1
46	BD1	GBP408, 4A_800V	1
47	C1	Capacitor, aluminum electrolytic, 82uF/450V, 105℃, Rubycon, CXW Type	1
48	C2	Capacitor, aluminum electrolytic,10uF/63V; 105℃, Hermei, LE Type	1
49	C21,C22	Capacitor, solid capacitor,390uF/25V	2
50	C10	Capacitor, aluminum electrolytic,10uF/50V; 105℃	1
51	C19	Capacitor, aluminum electrolytic,10uF/100V; 105℃	1
52	CX1	Capacitor, X2, 0.33uF/275VAC, 105℃ ,±20%	1
53	CY1	Capacitor, Y1, 1000pF/400V, 105℃ ,±20%	1
54	J5,J6,J12,J13,J14,RT1	Jump Wire	6
55	F1	3.15A / 250V MSF RADIAL LEAD MICRO FUSE (Conquer)	1
56	LF1	Choke	1
57	LF2	Choke	1
58	L1	Jump Wire	1
59	T1	Transformer, RM-10, L=480μH	1
60	HS1	散熱片 of Q1	1
61	HS1	螺絲M3*6 of Q1	1
62	HS1	螺帽M3 of Q1	1
63	HS2	散熱片 of Q3	1
64	HS2	螺絲M3*6 of Q3	1
65	HS2	螺帽M3 of Q3	1
66	HS2	絕緣片 TO-220 of Q3	1
67	HS2	絕緣粒 of Q3	1
68	Q3	bead core,GL5B RH 3.5*3*1.5	1
69	Q3	80A, 100V N-CHANNEL POWER MOSFET,UTT80N10H	1
70	D4,D8	HIGH-SPEED SWITCHING DIODE, UTC 1N4148, SOD-123	2
71	D9	1.0A SCHOTTKY BARRIER RECTIFIER,UTC SB140,SOD-123S	1
72	D2	SUPERFAST RECOVERY RECTIFIER, UTC ES1D, SMA	1



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73	D10	1.0AMP SURFACE MOUNT GLASS SUPERFAST RECOVERY RECTIFIER, UTC ES1D, SMA	1
74	Q2-1	VOLTAGE RANGE REGULATOR, UTC UAS16V, TO-92	1
75	Q1	15A, 650V N-CHANNEL SUPER-JUNCTION MOSFET, UTC 15NM65, TO220F	1
76	Q5, Q7	NPN GENERAL PURPOSE AMPLIFIER, UTC MMBT4401	2
77	Q8	PNP GENERAL PURPOSE AMPLIFIER, UTC MMBT4403	1
78	Q4	-13A, -30V P-CHANNEL Trench Power MOSFET, UTC UT4407, SOP-8	1
79	U1	IC, PWM controller, UTC UC3875A, SOP-8	1
80	No Component	Q2, R4, R14, R22, R30, R35, C12, C17, C25, C26, D3	11
: The Yellow color block means the parts that UTC can provide.			

2.3. Open frame Module Snapshot

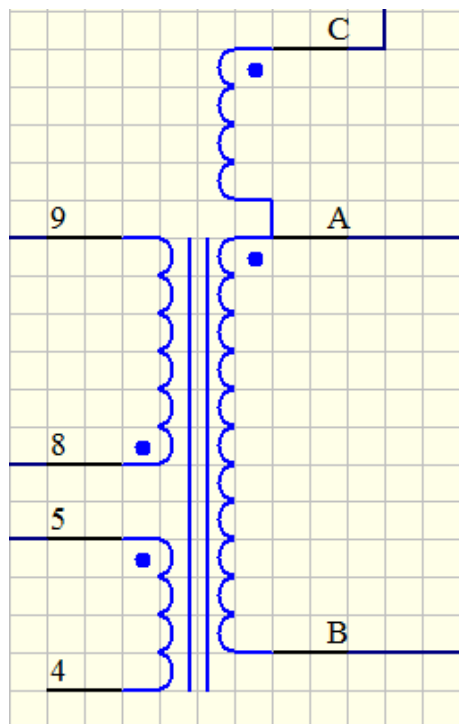


2.4. Transformer Design

2.4.1. Transformer Specification

- 1) Bobbin: RM-8
- 2) Core material : PC40 (TDK) or equivalent.
- 3) Lm 8~9: 480μH,±10% (65KHz)

2.4.2. Transformer Diagram



●	N6(C-A)=0.45Φ X 1 X 3Ts	○	2T Tape
●	N5(5-4)=0.21Φ X 1 X 11Ts	○	2T Tape
●	N4(7-9)=0.32Φ X 1 X 14Ts	○	2T Tape
●	N3(A-B)=0.5Φ X 2X 6Ts	○	2T Tape
●	N2(A-B)=0.5Φ X 2X 6Ts	○	2T Tape
●	N1(8-7)=0.32Φ X 1 X 25Ts	○	

Bottom

Transformer Winding Data

Layer No.	Winding	Material	Start	Turns	Finish	説明
1	N1	0.32ΦX1 2 UEW	8	25	7	
2	Tape	Tape		2		
3	N2	Triple Insulated Wire 0.5ΦX2	A	6	B	
4	Tape	Tape		2		
5	N3	Triple Insulated Wire 0.5ΦX2	A	6	B	
6	Tape	Tape		2		
7	N4	0.32ΦX1 2 UEW	7	14	9	
8	Tape	Tape		2		
9	N5	0.21ΦX1 2 UEW	5	11	4	
10	Tape	Tape		2		
11	N6	Triple Insulated Wire 0.45ΦX1	C	3	A	

45W PD Power Module Using UC3875A+VP300

3. Performance Evaluation

This document presented here is to describe the open frame Module performance.

All data was measured of board end.

The Summarized Result : Item

1. Input Characteristics	Vin	115Vac	230Vac
Standby Power at No Load (Vout=5V)	mW	43.0	61.0

2. Output characteristics		Unit	Output and Test result				
		V	5	9	12	15	20
Contunuous Output Power	Typ.	Watt	15	27	36	45	45
Ripple and Noise	Max.	mV _{P-P}	96.00	NA	126.00	NA	186.00
Line Regulation	Max.		0.04%	NA	0.01%	NA	0.08%
Load Regulation	Max.		2.78%	NA	0.92%	NA	0.69%
Averaged Efficiency (25%~100% Load)	@115VAC		87.69%	89.22%	89.58%	89.43%	88.86%
	@230VAC		84.60%	88.35%	89.03%	89.37%	88.73%

Test Equipment:

Item	Vendor	Model No:
1.AC Source	Chroma	61602
2.Digital Power meter	Chroma	66202
3.Electronic Load	Chroma	63102
4.Digital Oscilloscope	Tektronix	DPO3014
5.Multi-meter	Keithley	2000
6.Thermal meter	Optex	PT-3S



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3.1. Input Characteristics

3.1.1A Full Load Efficiency@ 5V output

Table 1A Full Load Efficiency :

Input	Pin(W)	Board end Vo(V)	Io(A)	Board end Eff(%)
115Vac/60Hz	17.988	5.202	3	86.76%
230Vac/50Hz	18.104	5.204		86.24%

3.1.2A Efficiency(meet level 6):

Table 2A Efficiency(meet level 6) :

Input Voltage	25%(0.75A)			50%(1.5A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	4.331	5.044	87.35	8.877	5.247	88.66
230Vac/50Hz	4.807	5.046	78.73	9.095	5.246	86.52
Input Voltage	75%(2.25A)			100%(3A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	13.359	5.224	87.99	17.988	5.202	86.76
230Vac/50Hz	13.527	5.225	86.91	18.104	5.204	86.24

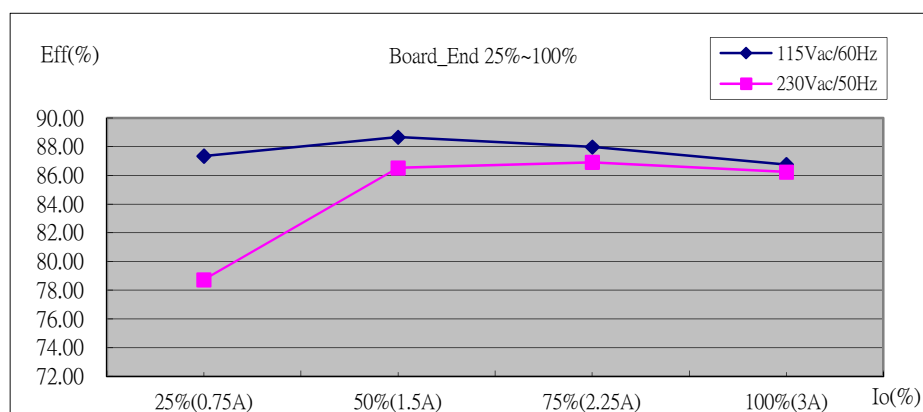


Fig.1A Efficiency VS Io(%)



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3.1.1B Full Load Efficiency@ 9V output

Table 1B Full Load Efficiency :

Input	Pin(W)	Board end Vo(V)	Io(A)	Board end Eff(%)
115Vac/60Hz	31.085	9.173	3	88.53%
230Vac/50Hz	31.100	9.175		88.50%

3.1.2B Efficiency(meet level 6):

Table 2B Efficiency(meet level 6) :

Input Voltage	25%(0.75A)			50%(1.5A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	7.609	9.042	89.12	15.368	9.211	89.90
230Vac/50Hz	7.825	9.046	86.70	15.526	9.214	89.02
Input Voltage	75%(2.25A)			100%(3A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	23.15	9.19	89.32	31.085	9.173	88.53
230Vac/50Hz	23.192	9.192	89.18	31.1	9.175	88.50

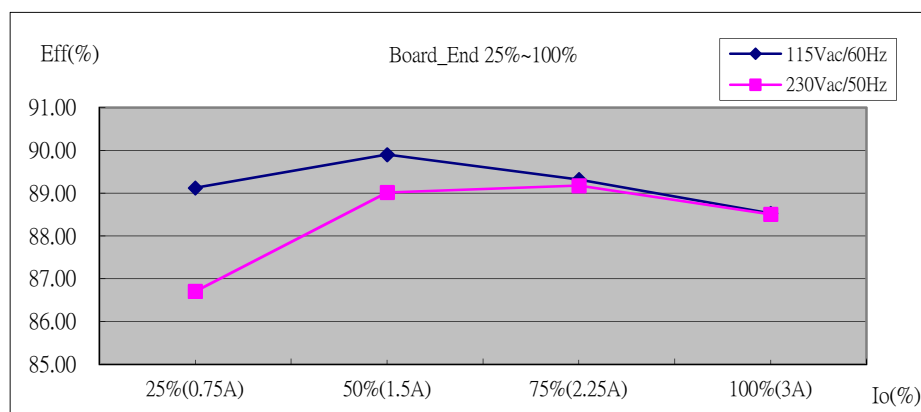


Fig.1B Efficiency VS Io(%)



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3.1.1C Full Load Efficiency@ 12V output

Table 1C Full Load Efficiency :

Input	Pin(W)	Board end Vo(V)	Io(A)	Board end Eff(%)
115Vac/60Hz	40.952	12.162	3	89.09%
230Vac/50Hz	40.810	12.162		89.40%

3.1.2C Efficiency(meet level 6):

Table 2C Efficiency(meet level 6) :

Input Voltage	25%(0.75A)			50%(1.5A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	10.107	12.028	89.25	20.311	12.2	90.10
230Vac/50Hz	10.275	12.026	87.78	20.491	12.198	89.29
Input Voltage	75%(2.25A)			100%(3A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	30.487	12.178	89.88	40.952	12.162	89.09
230Vac/50Hz	30.573	12.179	89.63	40.81	12.162	89.40

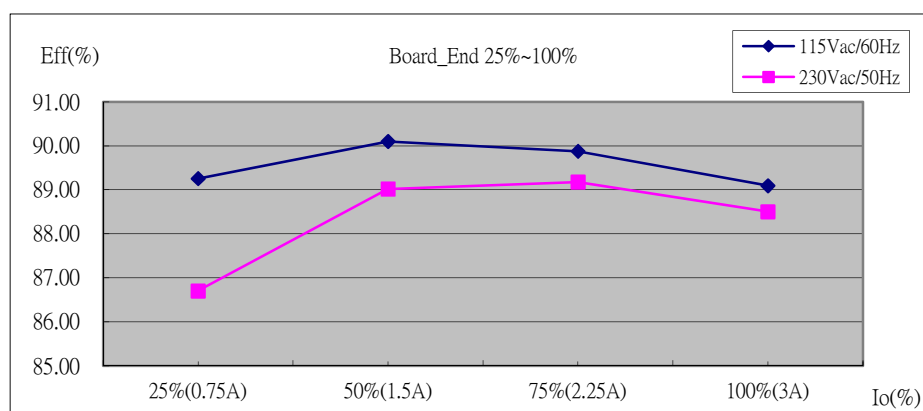


Fig.1C Efficiency VS Io(%)



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3.1.1D Full Load Efficiency@ 15V output

Table 1D Full Load Efficiency :

Input	Pin(W)	Board end Vo(V)	Io(A)	Board end Eff(%)
115Vac/60Hz	50.970	15.145	3	89.14%
230Vac/50Hz	50.535	15.144		89.90%

3.1.2D Efficiency(meet level 6):

Table 2D Efficiency(meet level 6) :

Input Voltage	25%(0.75A)			50%(1.5A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	12.702	15.014	88.65	25.348	15.186	89.87
230Vac/50Hz	12.817	15.01	87.83	25.515	15.179	89.24
Input Voltage	75%(2.25A)			100%(3A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	37.88	15.162	90.06	50.97	15.145	89.14
230Vac/50Hz	37.703	15.164	90.49	50.535	15.144	89.90

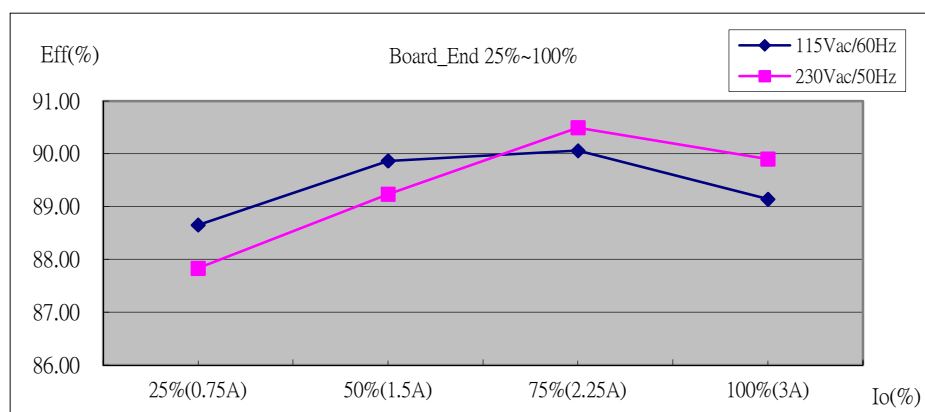


Fig.1D Efficiency VS Io(%)



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3.1.1E Full Load Efficiency@ 20V output

Table 1E Full Load Efficiency :

Input	Pin(W)	Board end Vo(V)	Io(A)	Board end Eff(%)
115Vac/60Hz	50.647	20.228	2.25	89.86%
230Vac/50Hz	50.394	20.232		90.33%

3.1.2E Efficiency(meet level 6):

Table 2E Efficiency(meet level 6) :

Input Voltage	25%(0.5625A)			50%(1.125A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	12.985	20.086	87.01	25.412	20.066	88.83
230Vac/50Hz	13.091	20.084	86.30	25.583	20.07	88.26
Input Voltage	75%(1.6875A)			100%(2.25A)		
	Pi(W)	B.Vo(V)	B.Eff(%)	Pi(W)	B.Vo(V)	B.Eff(%)
115Vac/60Hz	38.064	20.242	89.74	50.647	20.228	89.86
230Vac/50Hz	37.944	20.241	90.02	50.394	20.232	90.33

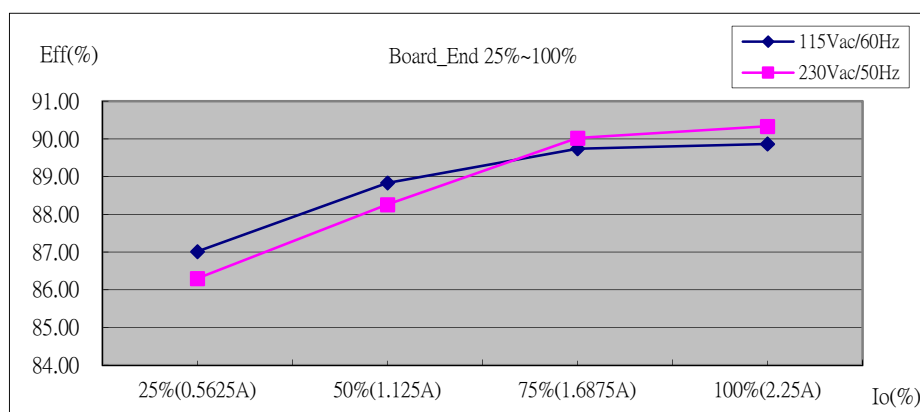


Fig.1E Efficiency VS Io(%)



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45W PD Power Module Using UC3875A+VP300

Table 4A Average Efficiency(meet level 6) @ 5V output

Input Voltage	Average	SPEC	Result
	Board Average Efficiency (%)		
115Vac/60Hz	87.69	> 81.39%	PASS
230Vac/50Hz	84.60		PASS

Table 4B Average Efficiency(meet level 6) @ 9V output

Input Voltage	Average	SPEC	Result
	Board Average Efficiency (%)		
115Vac/60Hz	89.22	> 86.62%	PASS
230Vac/50Hz	88.35		PASS

Table 4C Average Efficiency(meet level 6) @ 12V output

Input Voltage	Average	SPEC	Result
	Board Average Efficiency (%)		
115Vac/60Hz	89.58	> 87.40%	PASS
230Vac/50Hz	89.03		PASS

Table 4D Average Efficiency(meet level 6) @ 15V output

Input Voltage	Average	SPEC	Result
	Board Average Efficiency (%)		
115Vac/60Hz	89.43	> 87.73%	PASS
230Vac/50Hz	89.37		PASS

Table 4E Average Efficiency(meet level 6) @ 20V output

Input Voltage	Average	SPEC	Result
	Board Average Efficiency (%)		
115Vac/60Hz	88.86	> 87.73%	PASS
230Vac/50Hz	88.73		PASS



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3.1.3 Input Power under No Load

3.1.3.1

Table 5A Standby Power Test Data@ 5V output Load=0A

Input Voltage	Stand by power		
	Pin(mW)	SPEC	Result
90Vac/60Hz	40.0	< 100 mW	PASS
115Vac/60Hz	43.0		PASS
230Vac/50Hz	61.0		PASS
264Vac/50Hz	68.0		PASS



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3.2 Output Characteristics

3.2.1 Line Regulation and Load Regulation

Table 6A Line Regulation&Load Regulation@ 5 V output

Input Voltage	Load			Load Regulation%	SPEC (±)	Result
	0% Load	50% Load	100% Load			
90Vac/60Hz	5.069	5.250	5.208	2.78%	5.00%	PASS
264Vac/50Hz	5.068	5.248	5.207	2.78%		PASS
Line Regulation%	0.02%	0.04%	0.02%		1.00%	PASS

Table 6B Line Regulation&Load Regulation@ 12 V output

Input Voltage	Load			Load Regulation%	SPEC (±)	Result
	0% Load	50% Load	100% Load			
90Vac/60Hz	12.050	12.200	12.159	0.91%	5.00%	PASS
264Vac/50Hz	12.050	12.199	12.160	0.92%		PASS
Line Regulation%	0.00%	0.01%	0.01%		1.00%	PASS

Table 6C Line Regulation&Load Regulation@ 20 V output

Input Voltage	Load			Load Regulation%	SPEC (±)	Result
	0% Load	50% Load	100% Load			
90Vac/60Hz	20.108	20.073	20.244	0.68%	5.00%	PASS
264Vac/50Hz	20.093	20.072	20.232	0.69%		PASS
Line Regulation%	0.08%	0.01%	0.06%		1.00%	PASS



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3.2.2 Ripple and Noise

Test condition:

Ripple and Noise was measured at line end without probe cap and ground clip.

Add a 0.1uF ceramic capacitor connected in parallel with a 10uF electrolytic capacitor.

Measurement bandwidth was limited to 20MHz.

Table 7 Ripple & Noise

Input Voltage	Output Voltage	Output Load	Ripple and Noise(m V _{P-P})		SPEC (m V _{P-P})	Result
			Measured			
90Vac/60Hz	5V	Full Load	79.20	Fig 2	200	PASS
	12V	Full Load	126.00	Fig 3		PASS
	20V	Full Load	186.00	Fig 4		PASS
264Vac/50Hz	5V	Full Load	96.00	Fig 5		PASS
	12V	Full Load	125.00	Fig 6		PASS
	20V	Full Load	156.00	Fig 7		PASS

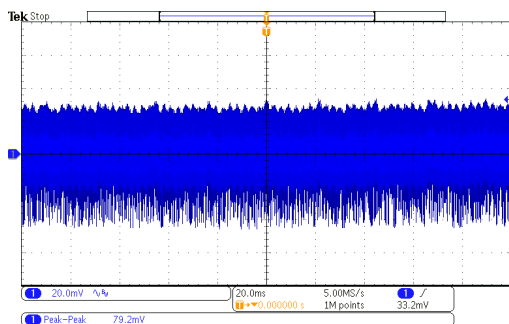


Fig. 2 90Vac/60Hz@ 5Vout Full Load

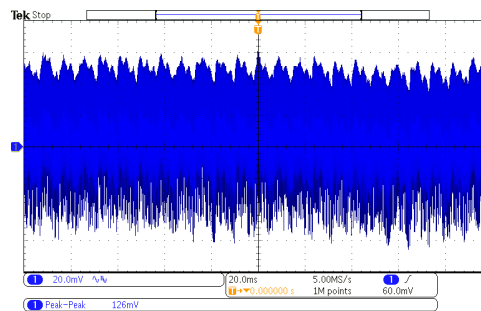


Fig. 3 90Vac/60Hz@ 12Vout Full Load

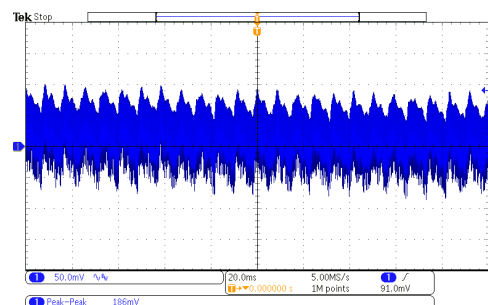


Fig. 4 90Vac/60Hz@ 20Vout Full Load

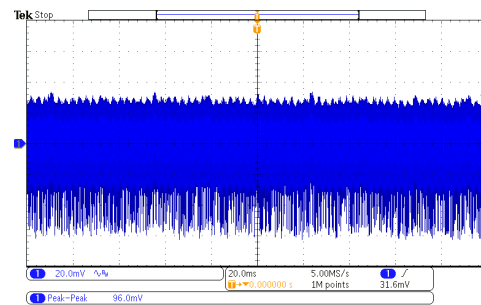


Fig. 5 264Vac/50Hz@ 5Vout Full Load

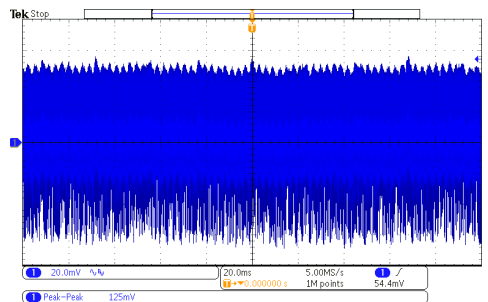


Fig. 6 264Vac/50Hz@ 12Vout Full Load

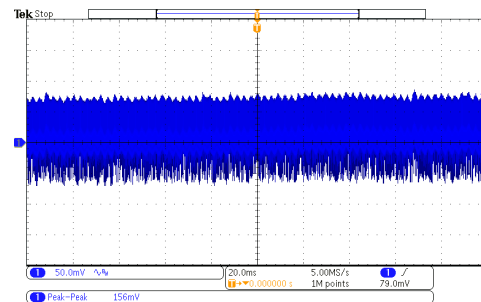


Fig. 7 264Vac/50Hz@ 20Vout Full Load



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3.2.3 Load transient

Test condition 1: 10% Max. load/50ms $\rightleftharpoons$ 90% Max. load/50ms with 1.25A/us slew rate.

Test condition 2: 20% Max. load/50ms $\rightleftharpoons$ 80% Max. load/50ms with 1.25A/us slew rate.

Table 8A 10% Max. load to 90% Max. load transient

Input Voltage	Output Voltage	Measured Vout (V)		Spec	Result	Remark
		Max	Min			
90Vac/60Hz	5V	5.30	4.78	Vout $\pm$ 5%	Ref.	Fig.8
	12V	12.40	11.60		Ref.	Fig.9
	20V	20.70	19.50		Ref.	Fig.10
264Vac/50Hz	5V	5.30	4.74		Ref.	Fig.11
	12V	12.40	11.70		Ref.	Fig.12
	20V	20.70	19.50		Ref.	Fig.13

Table 8B 20% Max. load to 80% Max. load transient

Input Voltage	Output Voltage	Measured Vout (V)		Spec	Result	Remark
		Max	Min			
90Vac/60Hz	5V	5.26	4.74	Vout $\pm$ 5%	Ref.	Fig.14
	12V	12.40	11.70		Ref.	Fig.15
	20V	20.70	19.70		Ref.	Fig.16
264Vac/50Hz	5V	5.26	4.82		Ref.	Fig.17
	12V	12.40	11.80		Ref.	Fig.18
	20V	20.70	19.50		Ref.	Fig.19

CH1:Vbus, CH2:Vds_SR, CH3: Iout, CH4: Vgs_SR

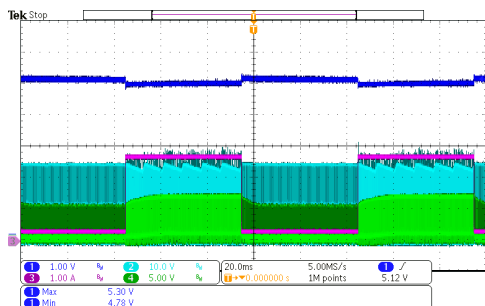


Fig.8 90Vac/60Hz; 5V; 10% $\rightleftharpoons$ 90% Load

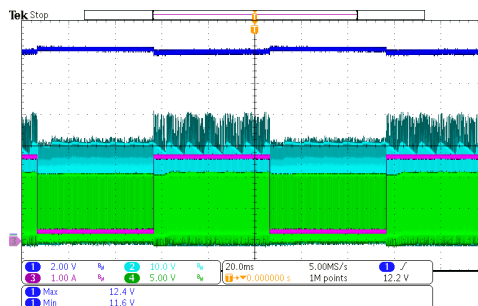


Fig.9 90Vac/60Hz; 12V; 10% $\rightleftharpoons$ 90% Load

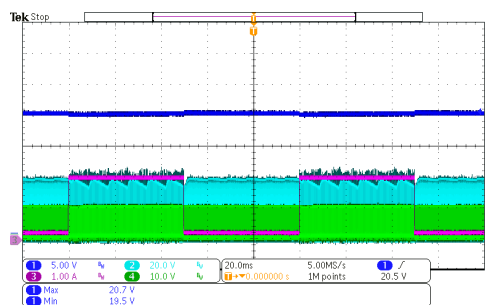


Fig.10 90Vac/60Hz; 20V; 10% $\rightleftharpoons$ 90% Load

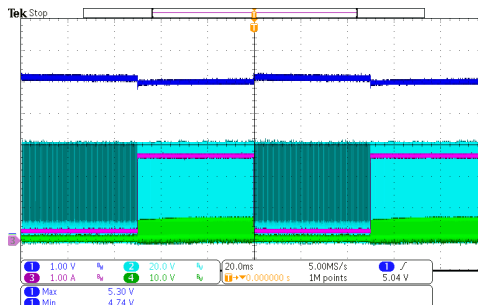


Fig.11 264Vac/50Hz; 5V; 10% $\rightleftharpoons$ 90% Load



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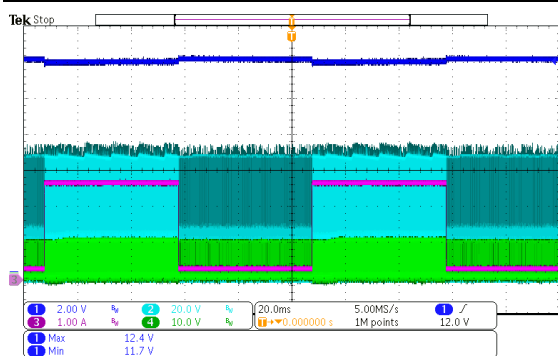


Fig.12 264Vac/50Hz; 12V; 10% $\rightarrow$ 90% Load

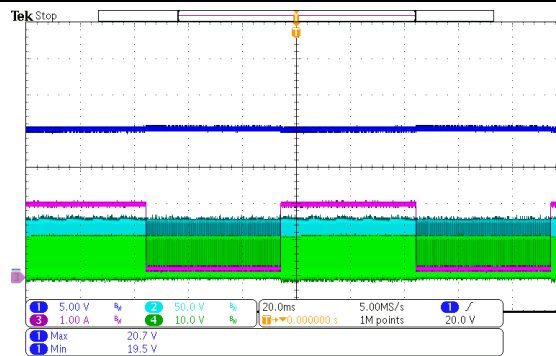


Fig.13 264Vac/50Hz; 20V; 10% $\rightarrow$ 90% Load

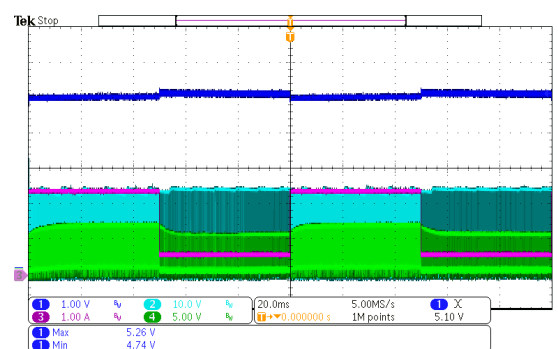


Fig.14 90Vac/60Hz; 5V; 20% $\rightarrow$ 80% Load

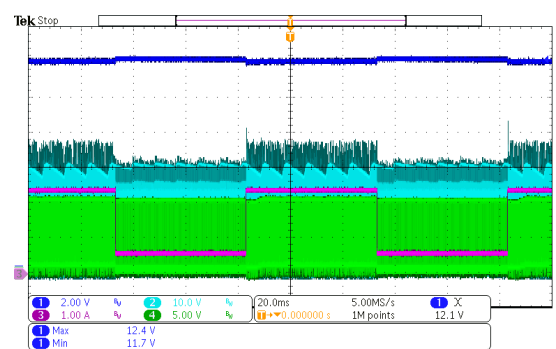


Fig.15 90Vac/60Hz; 12V; 20% $\rightarrow$ 80% Load

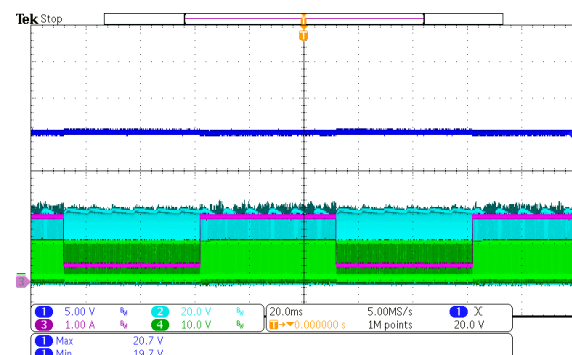


Fig.16 90Vac/60Hz; 20V; 20% $\rightarrow$ 80% Load

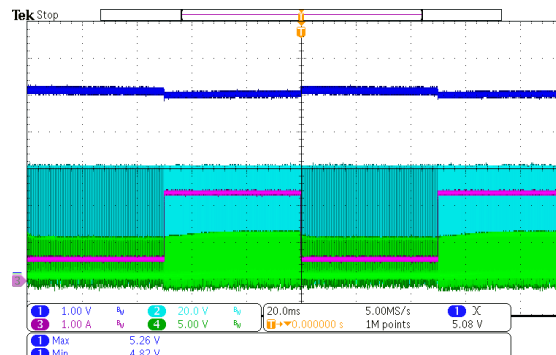


Fig.17 264Vac/50Hz; 5V; 20% $\rightarrow$ 80% Load

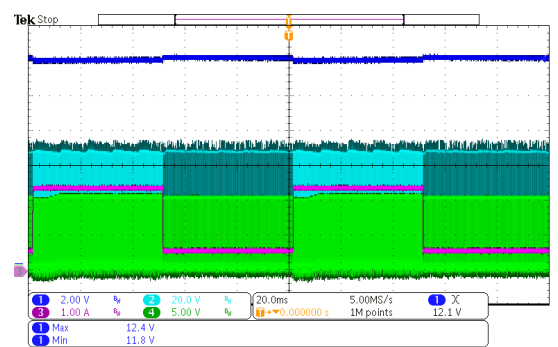


Fig.18 264Vac/50Hz; 12V; 20% $\rightarrow$ 80% Load

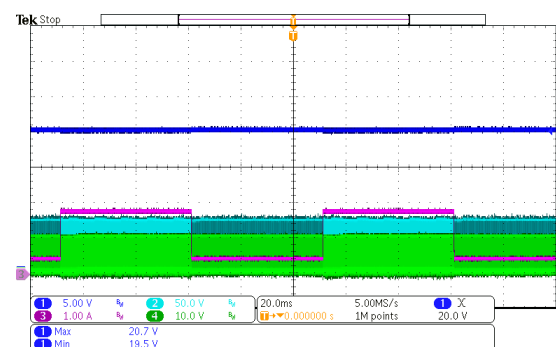


Fig.19 264Vac/50Hz; 20V; 20% $\rightarrow$ 80% Load



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3.2.4 Line transient

Table 9 Line transient

Input Voltage	Output Voltage	0% Load	100% Load	Remark
90Vac/60Hz ↓ 264Vac/50Hz	5V	5.16V→5.16V	5.28V→5.28V	Fig.20,21
	12V	12.16V→12.16V	12.36V→12.36V	Fig.22,23
264Vac/50Hz ↓ 90Vac/60Hz	20V	20.50V→20.50V	20.60V→20.60V	Fig.24,25
	5V	5.18V→5.18V	5.30V→5.30V	Fig.26,27
	12V	12.28V→12.28V	12.40V→12.40V	Fig.28,29
90Vac/60Hz	20V	20.70V→20.70V	20.70V→20.70V	Fig.30,31
Specification		Vout ± 1%		
Test Result		Ref.	Ref.	

CH1:Vbus, CH2:Vgs_SR, CH3: Vds_SR, CH4: Vac

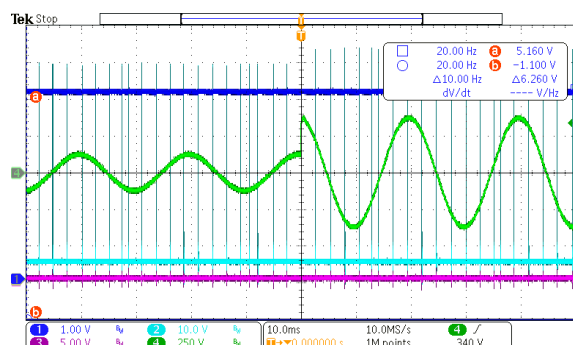


Fig.20 90Vac/60Hz → 264Vac/50Hz; 5V; 0% Load

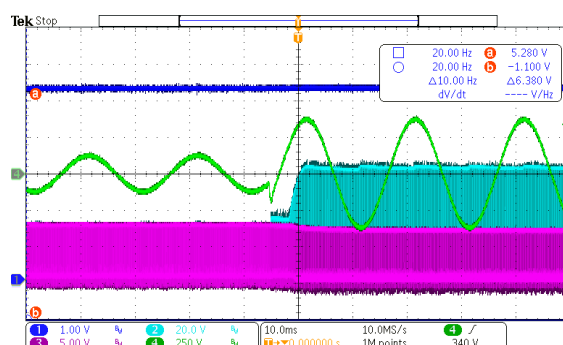


Fig.21 90Vac/60Hz → 264Vac/50Hz; 5V; 100% Load

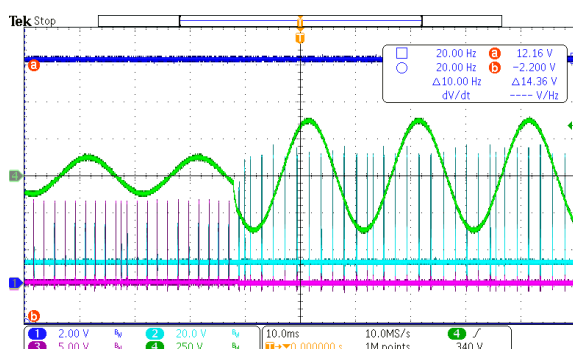


Fig.22 90Vac/60Hz → 264Vac/50Hz; 12V; 0% Load

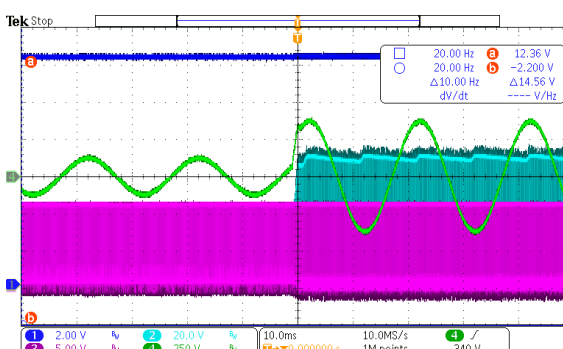


Fig.23 90Vac/60Hz → 264Vac/50Hz; 12V; 100% Load



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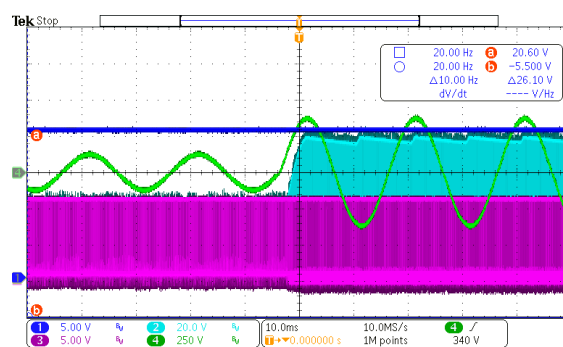
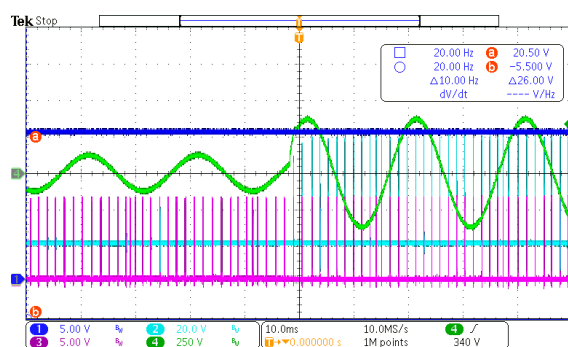


Fig. 24 90Vac/60Hz → 264Vac/50Hz; 20V; 0% Load

Fig. 25 90Vac/60Hz → 264Vac/50Hz; 20V; 100% Load

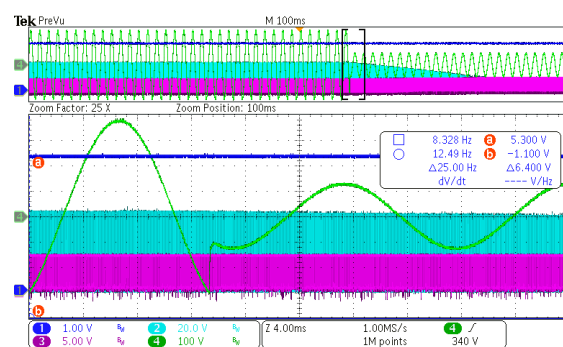
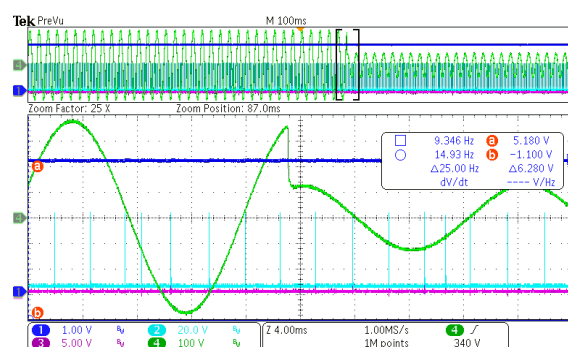


Fig. 26 264Vac/50Hz → 90Vac/60Hz; 5V; 0% Load

Fig. 27 264Vac/50Hz → 90Vac/60Hz; 5V; 100% Load

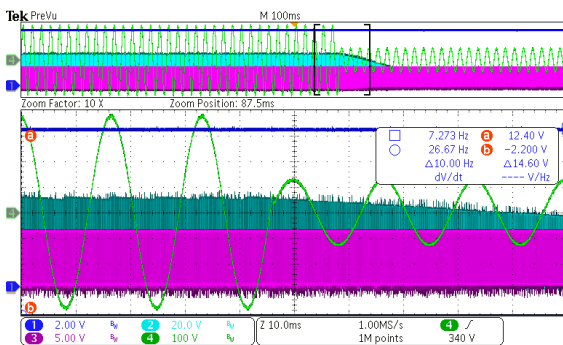
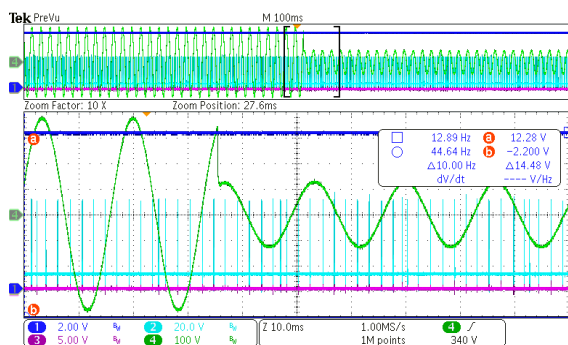


Fig. 28 264Vac/50Hz → 90Vac/60Hz; 12V; 0% Load

Fig. 29 264Vac/50Hz → 90Vac/60Hz; 12V; 100% Load

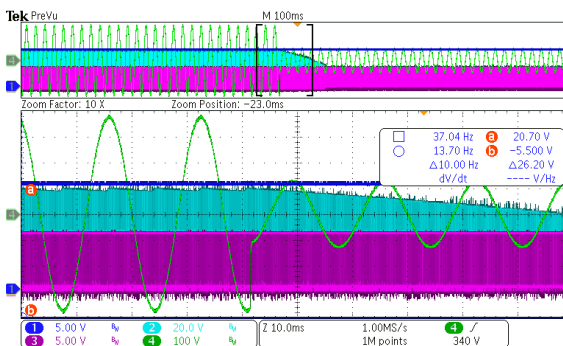
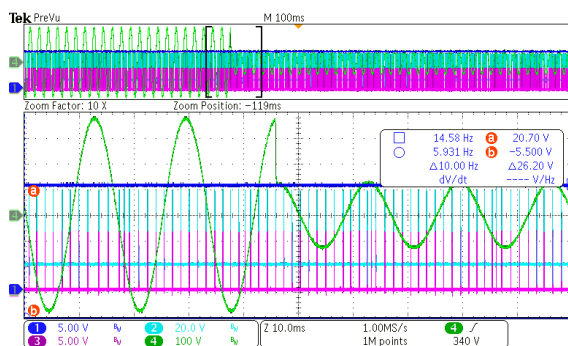


Fig. 30 264Vac/50Hz → 90Vac/60Hz; 20V; 0% Load

Fig. 31 264Vac/50Hz → 90Vac/60Hz; 20V; 100% Load



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3.2.5 Start-up Time

Table 10 Start-up Time

Input Voltage	Output Voltage	Output Load	Start-up Time	Test Result	Remark
90Vac/60Hz	5V	0% Load	191ms	Ref.	Fig.32
		100% Load	192ms	Ref.	Fig.33
264Vac/50Hz		0% Load	179ms	Ref.	Fig.34
		100% Load	181ms	Ref.	Fig.35

CH1:Vbus, CH2:Vgs_SR, CH3: Vout, CH4: Vbus_EN

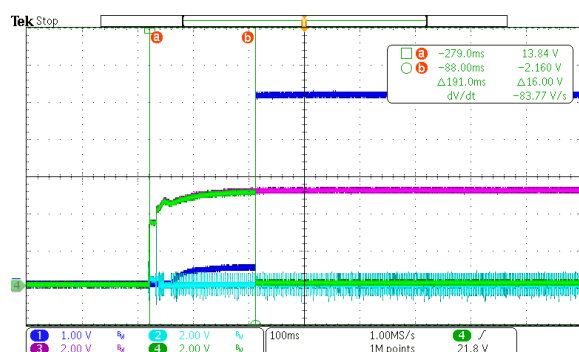


Fig. 32 90Vac / 60Hz; 5V; 0% Load Start-Up Time

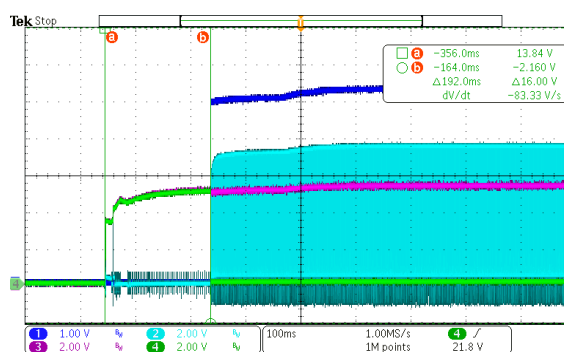


Fig. 33 90Vac / 60Hz; 5V; 100% Load Start-Up Time

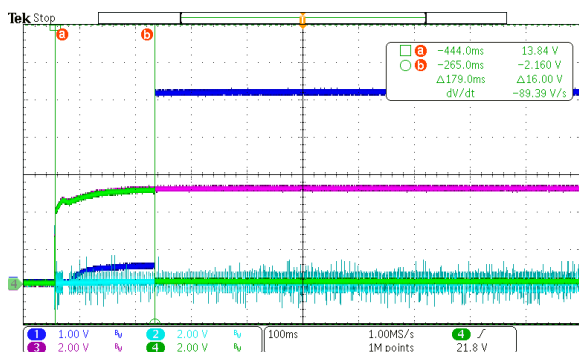


Fig. 34 264Vac / 50Hz; 5V; 0% Load Start-Up Time

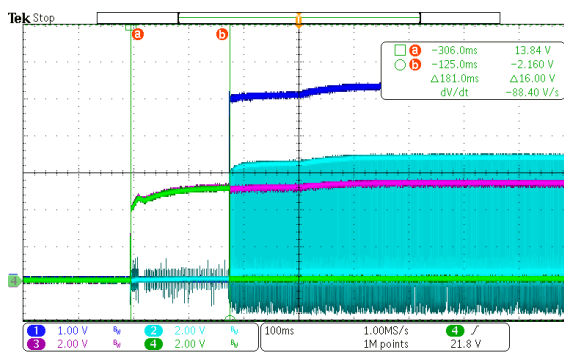


Fig. 35 264Vac / 50Hz; 5V; 100% Load Start-Up Time



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3.2.6 Hold-up Time

Table 11 Hold-up Time

Input Voltage	Output Voltage	Output Current	Hold-up Time	Specification	Test Result	Remark
90Vac/60Hz @ 0 Degree	5V	3A	27ms	>5ms	Pass	Fig.36
	12V	3A	8.6ms		Pass	Fig.37
	20V	2.25A	6.7ms		Pass	Fig.38

CH1:Vbus, CH2:Vgs_SR, CH3: Vds_SR, CH4: Vac

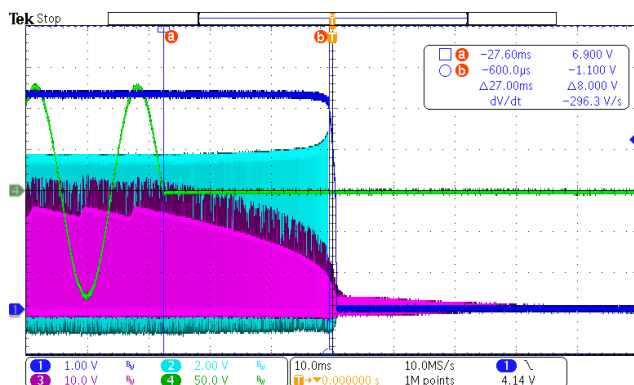


Fig. 36 Hold-up time; 5V; 3A

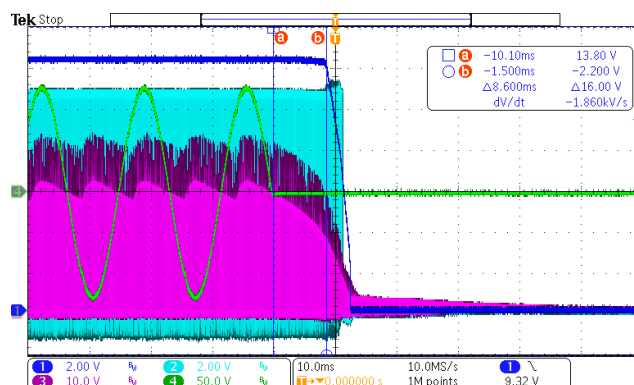


Fig. 37 Hold-up time; 12V; 3A

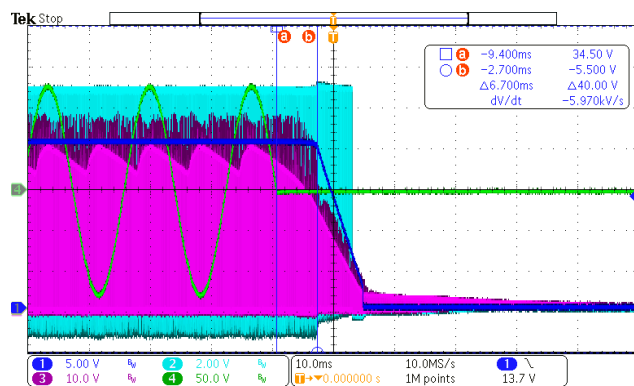


Fig. 38 Hold-up time; 20V; 2.25A



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3.2.7 AC OFF

Table 12 AC OFF

Input Voltage	Output Voltage	Output Current	Vbulk Level @SR UVP	Test Result	Remark
90Vac/60Hz ↓ AC OFF	5V	0.5A	21V	Ref.	Fig.39
		3A	18V	Ref.	Fig.40
	12V	0.5A	9.5V	Ref.	Fig.41
		3A	9V	Ref.	Fig.42
	20V	0.5A	8.5V	Ref.	Fig.43
		2.25A	8.5V	Ref.	Fig.44

CH1:Vbus, CH2:Vgs_SR, CH3: Vds_SR, CH4: Vbulk



Fig. 39 90Vac/60Hz → AC OFF; 5V; 0.5A

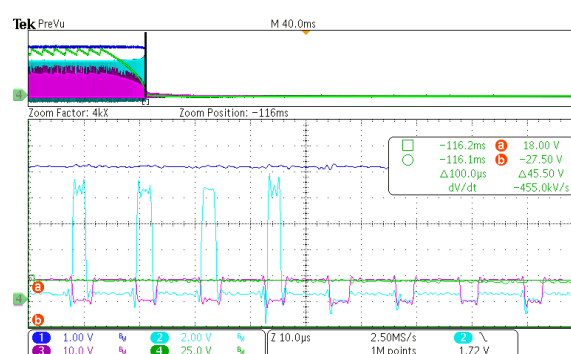


Fig. 40 90Vac/60Hz → AC OFF; 5V; 3A

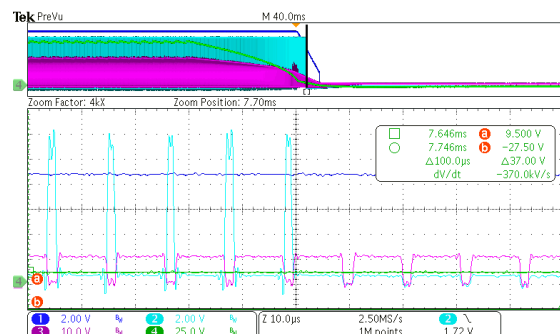


Fig. 41 90Vac/60Hz → AC OFF; 12V; 0.5A

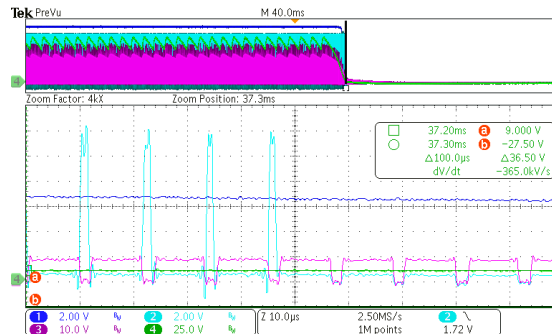


Fig. 42 90Vac/60Hz → AC OFF; 12V; 3A

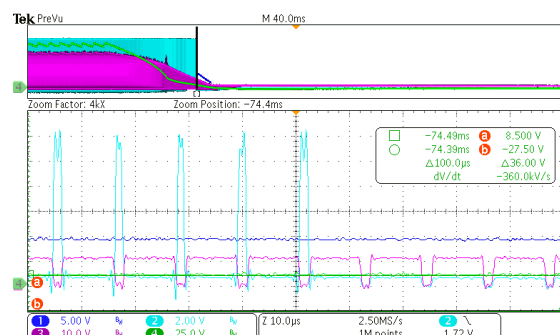


Fig. 43 90Vac/60Hz → AC OFF; 20V; 0.5A

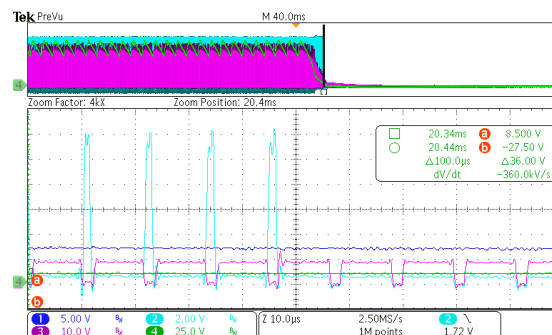


Fig. 44 90Vac/60Hz → AC OFF; 20V; 2.25A



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3.2.8 Output Voltage Rising Time

Table 13 Output Voltage Rising Time

Input Voltage	Output Voltage	Rising time (ms)		Specification	Test Result	Remark
		0% Load	100% Load			
90Vac/60Hz	5V→9V	172.80	189.80	<275ms	Pass	Fig.45,46
	9V→12V	195.70	204.70		Pass	Fig.47,48
	12V→15V	190.80	174.80		Pass	Fig.49,50
	15V→20V	153.80	157.70		Pass	Fig.51,52
264Vac/50Hz	5V→9V	211.80	195.80		Pass	Fig.53,54
	9V→12V	197.80	239.80		Pass	Fig.55,56
	12V→15V	173.80	182.80		Pass	Fig.57,58
	15V→20V	168.80	187.70		Pass	Fig.59,60

CH1:Vbus, CH2:Vgs_SR, CH3: Vds_SR

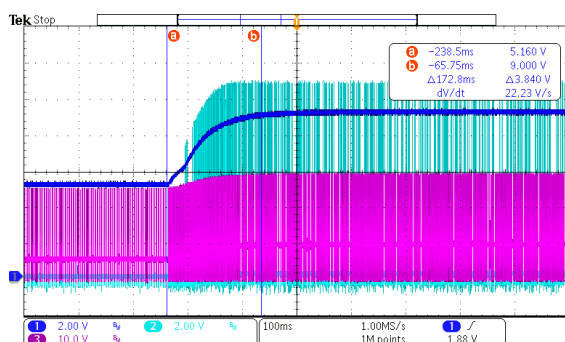


Fig.45 90Vac/60Hz; 5V → 9V; 0% Load

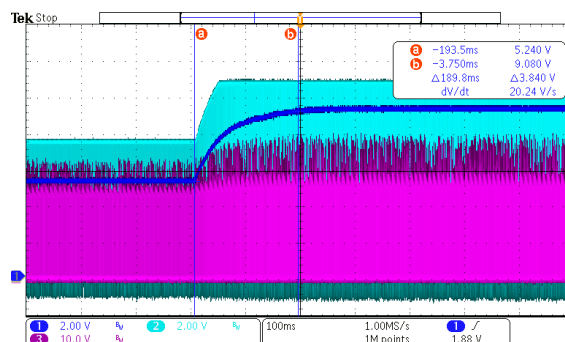


Fig.46 90Vac/60Hz; 5V → 9V; 100% Load

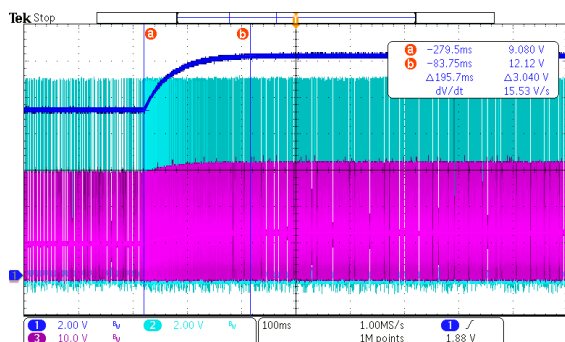


Fig.47 90Vac/60Hz; 9V → 12V; 0% Load

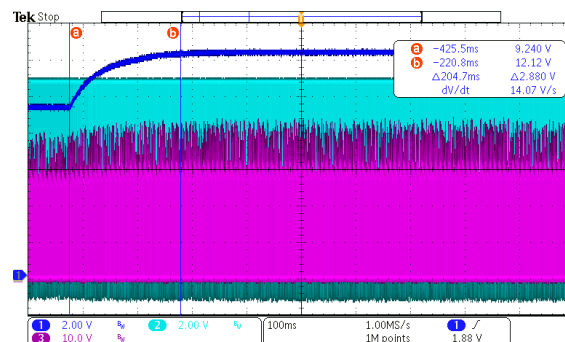


Fig.48 90Vac/60Hz; 9V → 12V; 100% Load



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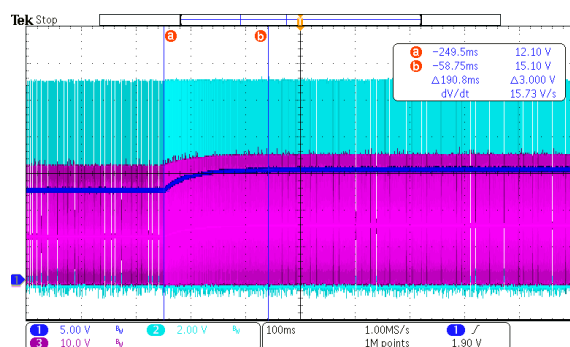


Fig.49 90Vac/60Hz; 12V → 15V; 0% Load

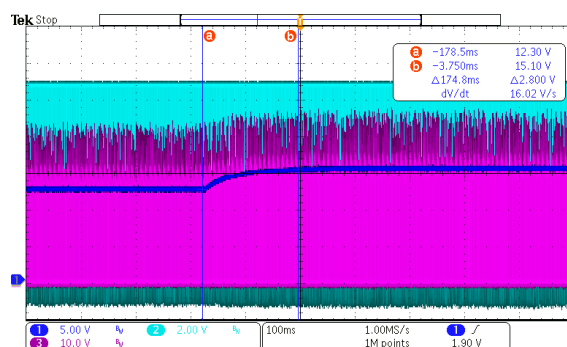


Fig.50 90Vac/60Hz; 12V → 15V; 100% Load

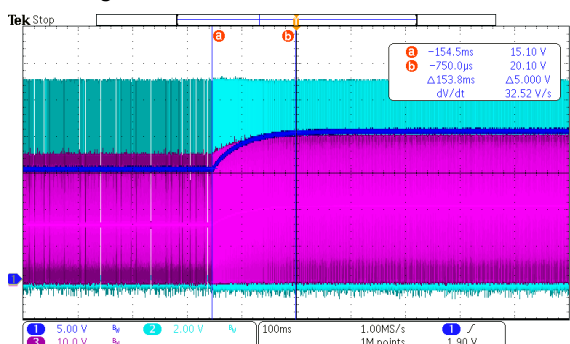


Fig.51 90Vac/60Hz; 15V → 20V; 0% Load

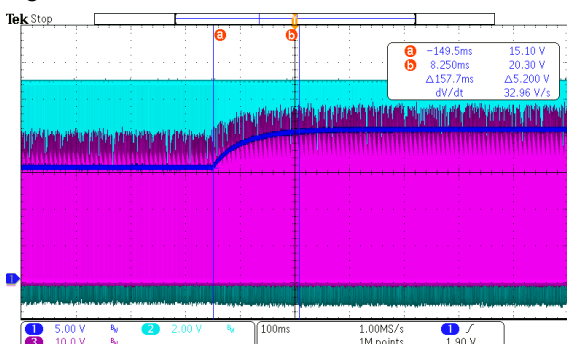


Fig.52 90Vac/60Hz; 15V → 20V; 100% Load

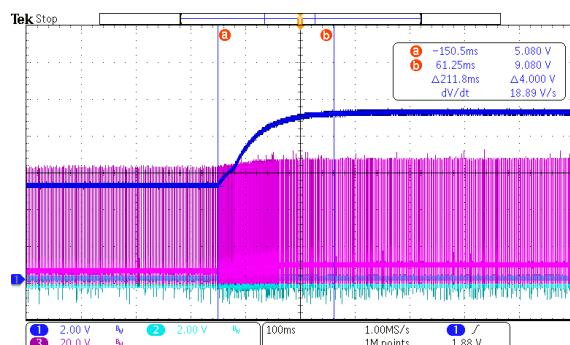


Fig.53 264Vac/50Hz; 5V → 9V; 0% Load

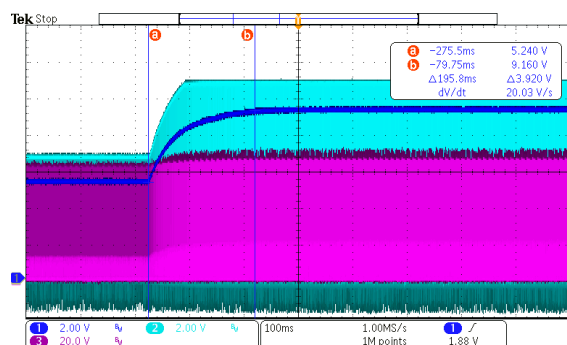


Fig.54 264Vac/50Hz; 5V → 9V; 100% Load

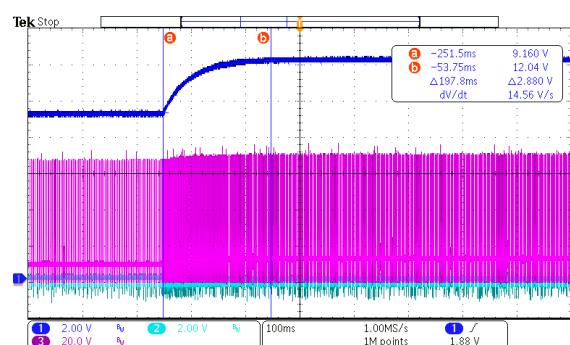


Fig.55 264Vac/50Hz; 9V → 12V; 0% Load

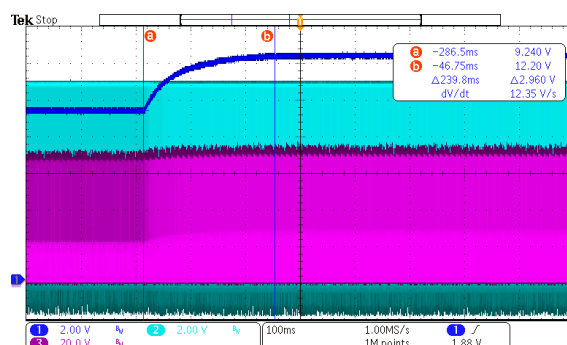


Fig.56 264Vac/50Hz; 9V → 12V; 100% Load



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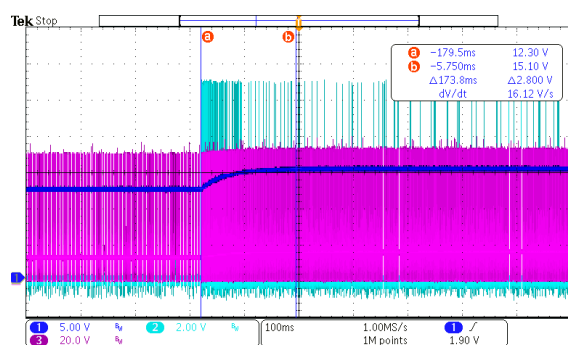


Fig.57 264Vac/50Hz; 12V → 15V; 0% Load

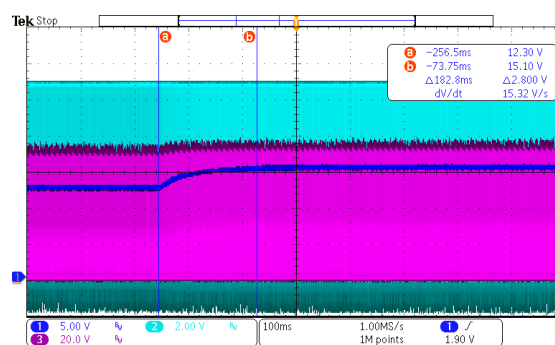


Fig.58 264Vac/50Hz; 12V → 15V; 100% Load

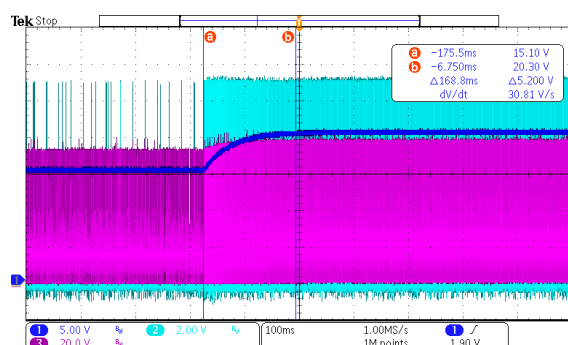


Fig.59 264Vac/50Hz; 15V → 20V; 0% Load

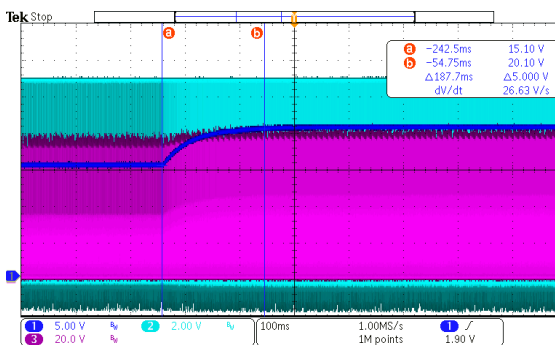


Fig.60 264Vac/50Hz; 15V → 20V; 100% Load

3.2.9 Output Voltage Falling Time

Table 14 Output Voltage Falling Time

Input Voltage	Output Voltage	Falling time (ms)		Specification	Test Result	Remark
		0A	2.25A			
90Vac/60Hz	20V→5V	268.80	243.80	<275ms	Pass	Fig.61,62
264Vac/50Hz	20V→5V	217.70	243.80		Pass	Fig.63,64

CH1:Vbus, CH2:Vgs_SR, CH3: Vds_SR

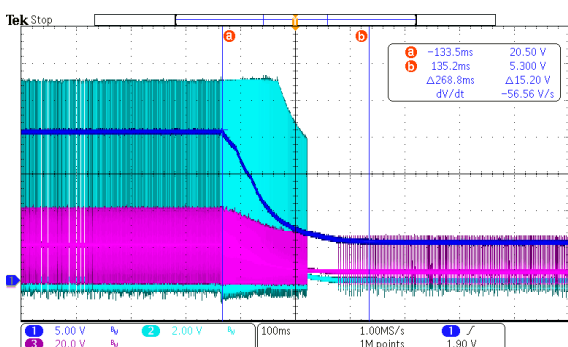


Fig.61 90Vac/60Hz; 20V → 5V; 0A

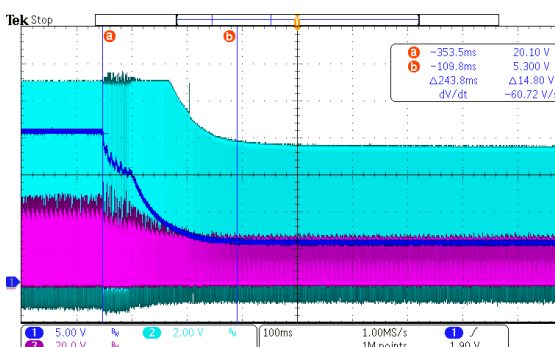


Fig.62 90Vac/60Hz; 20V → 5V; 2.25A



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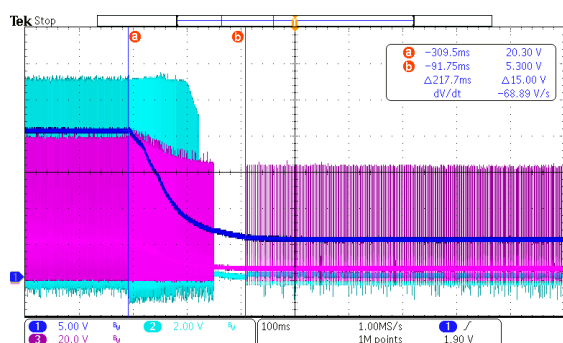


Fig.63 264Vac/50Hz; 20V → 5V; 0A

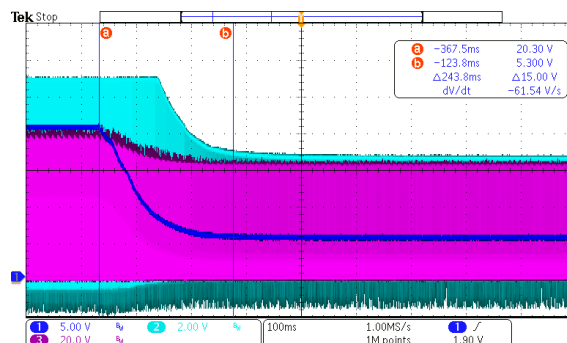


Fig.64 264Vac/50Hz; 20V → 5V; 2.25A

3.2.10 Cable Detached

Table 15 Cable Detached

Input Voltage	Output Voltage	Falling time (ms)		Test Result	Remark
		0A	2.25A		
90Vac/60Hz	20V→5V	247.5	235.5	Ref.	Fig.65,66
264Vac/50Hz	20V→5V	243.5	217.5	Ref.	Fig.67,68
Specifucation	Output Voltage Step Down to 5V				

CH1:Vbus, CH2:Vgs_SR, CH3: Vbus_EN

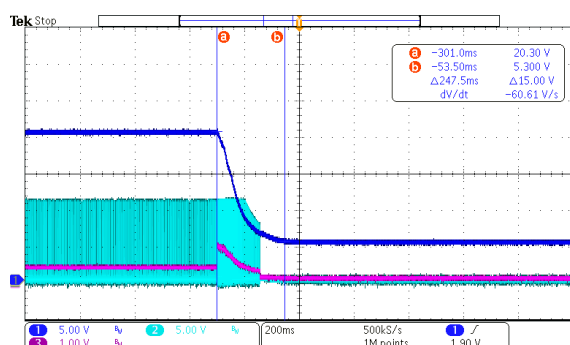


Fig.65 90Vac/60Hz; 20V → 5V; 0A

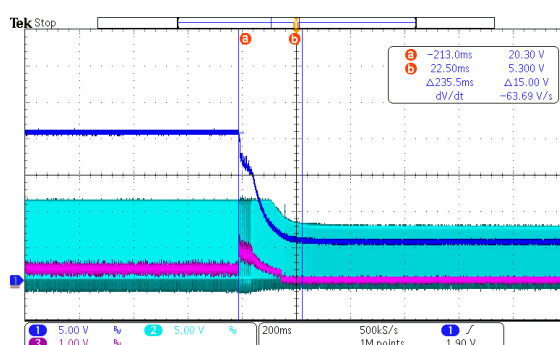


Fig.66 90Vac/60Hz; 20V → 5V; 2.25A

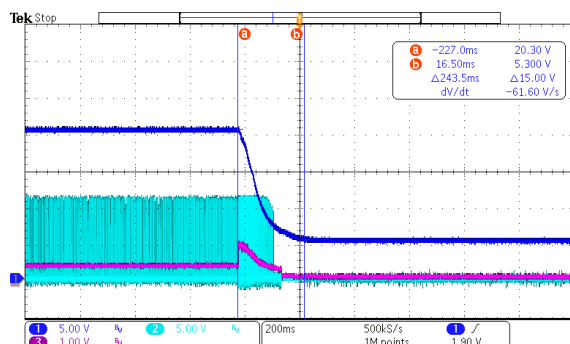


Fig.67 264Vac/50Hz; 20V → 5V; 0A

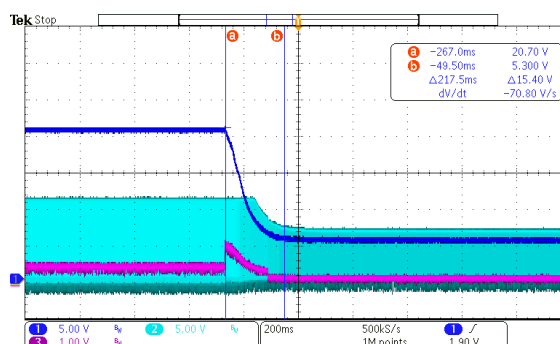


Fig.68 264Vac/50Hz; 20V → 5V; 2.25A



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3.2.11 Voltage Stress on Q1 Vds

Table 16 Voltage Stress on Q1Vds

Input Voltage	Output Voltage	Output Current	Test Condition	Stress on U1 Vds	Test Result	Remark
264Vac/50Hz	5V	3A	Start-up	450V	Pass	Fig.69
	15V→20V	2.25A	Output Voltage Step-up	558V	Pass	Fig.70
	20V	2.25A	Normal Operation	562V	Pass	Fig.71
Q1 Vds Spec	650V					

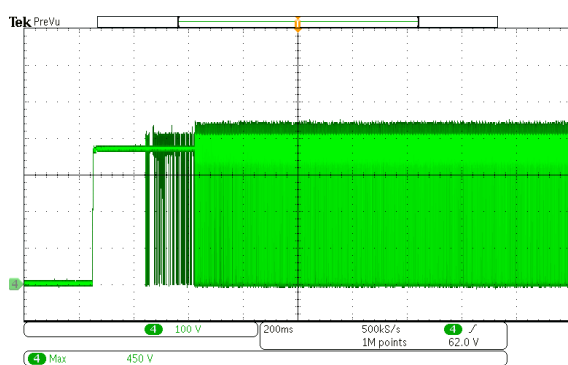


Fig.69 264Vac/50Hz; 5V; 3A; Start-up

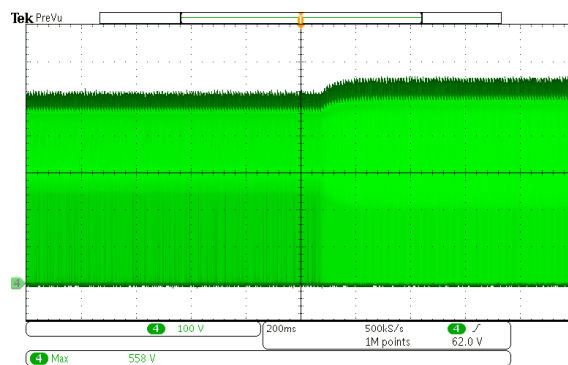


Fig.70 264Vac/50Hz; 15V → 20V; 2.25A; Step-up

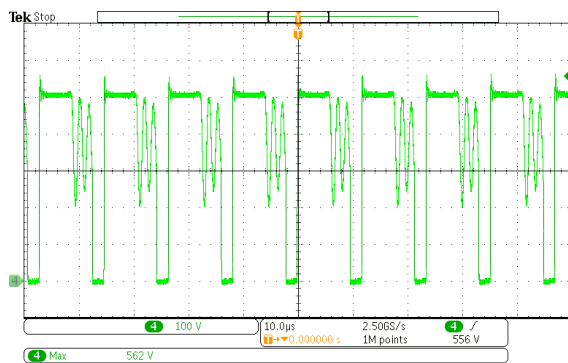


Fig.71 264Vac/50Hz; 20V; 2.25A; Normal

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3.2.12 Voltage Stress on SR MOSFET

Table 17 Voltage Stress on SR MOSFET

Input Voltage	Output Voltage	Output Current	Test Condition	Stress on SR MOSFET Vds	Test Result	Remark
264Vac/50Hz	5V	3A	Start-up	61.6V	Pass	Fig.72
	15V→20V	2.25A	Output Voltage Step-up	80.8V	Pass	Fig.73
	20V	2.25A	Normal Operation	81.6V	Pass Pass	Fig.74
SR MOSFET Vds Spec	100V					

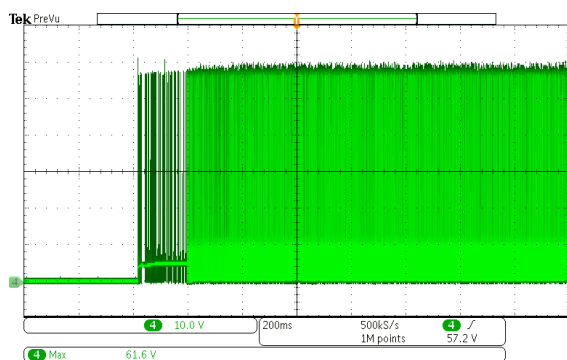


Fig.72 264Vac/50Hz; 5V; 3A; Start-up

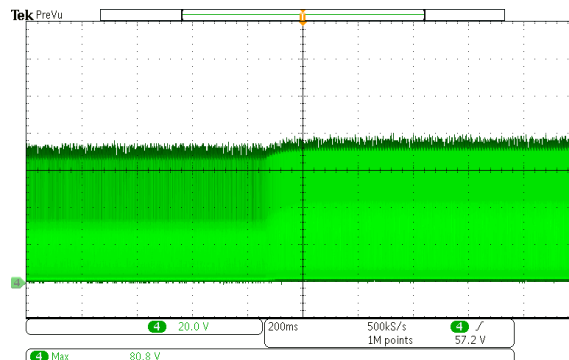


Fig.73 264Vac/50Hz; 15V → 20V; 2.25A; Step-up

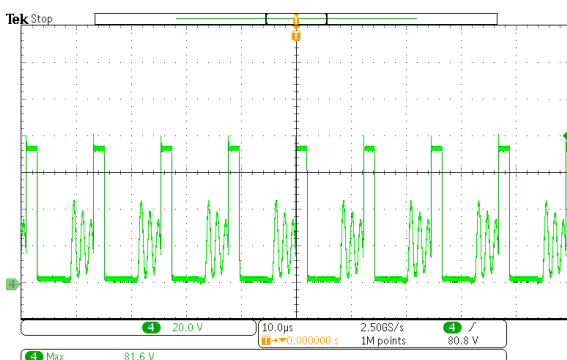
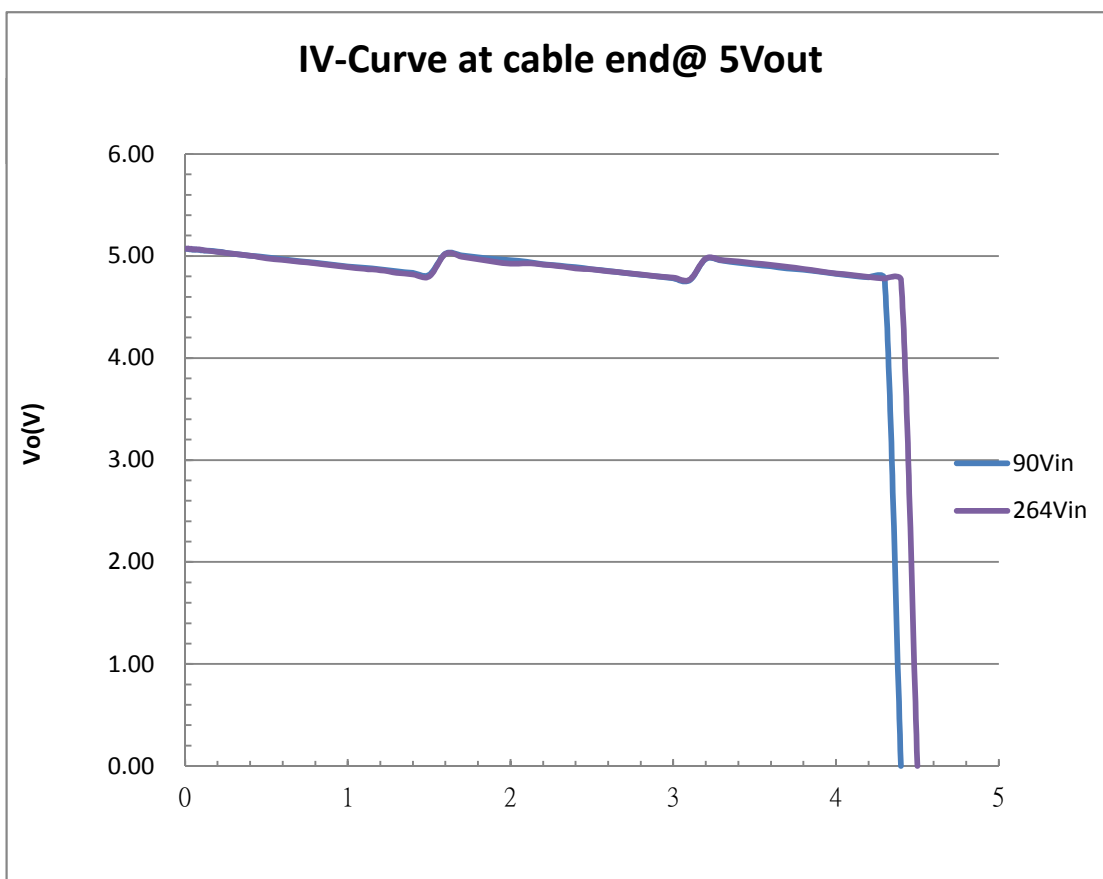
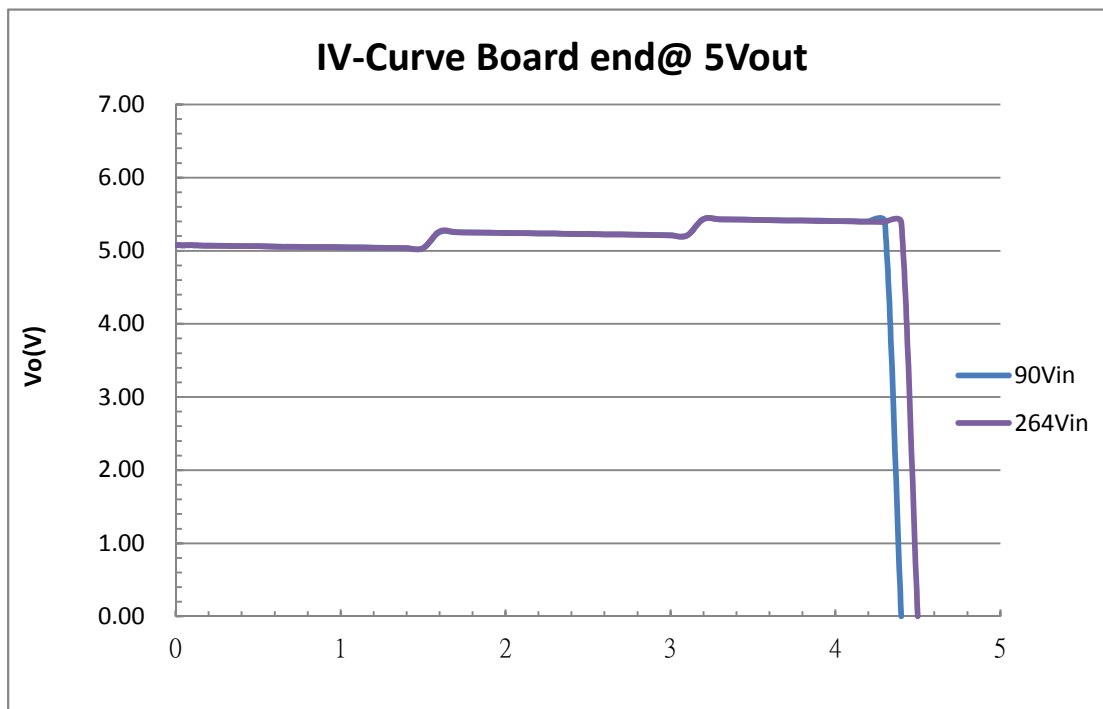


Fig.74 264Vac/50Hz; 20V; 2.25A; Normal

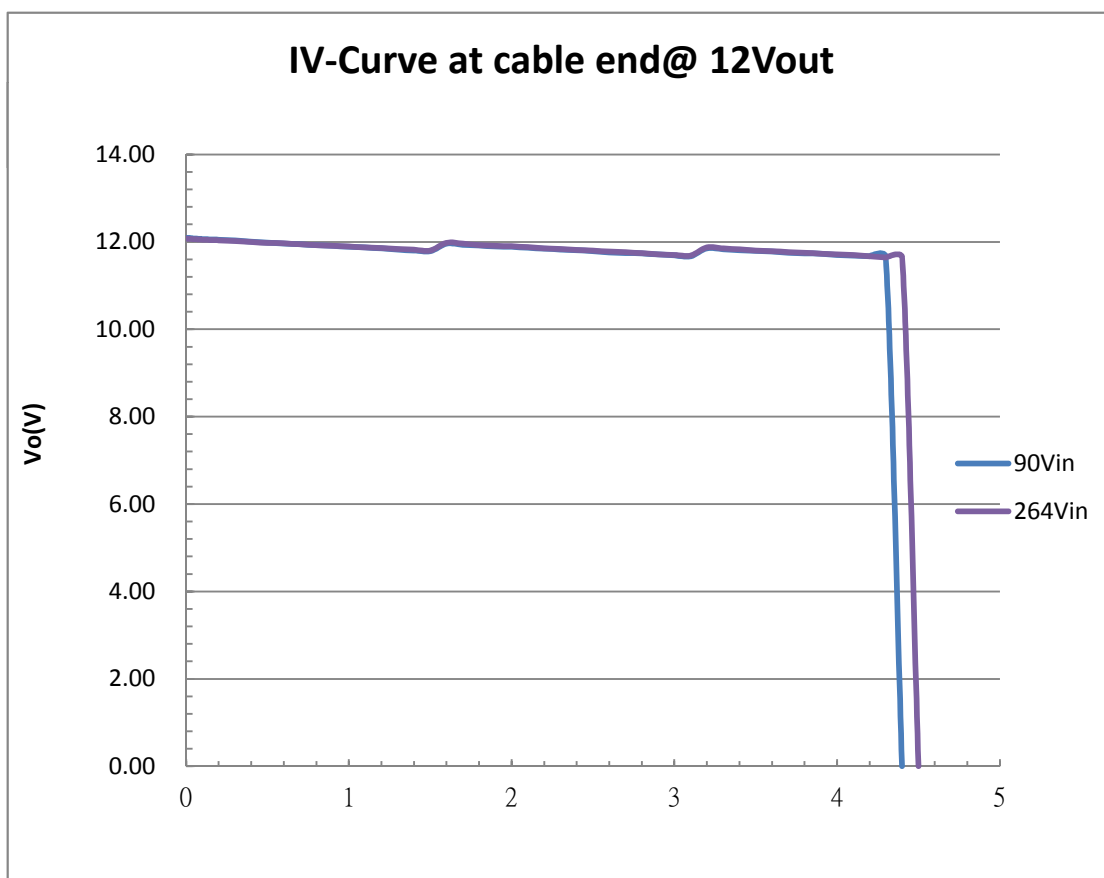
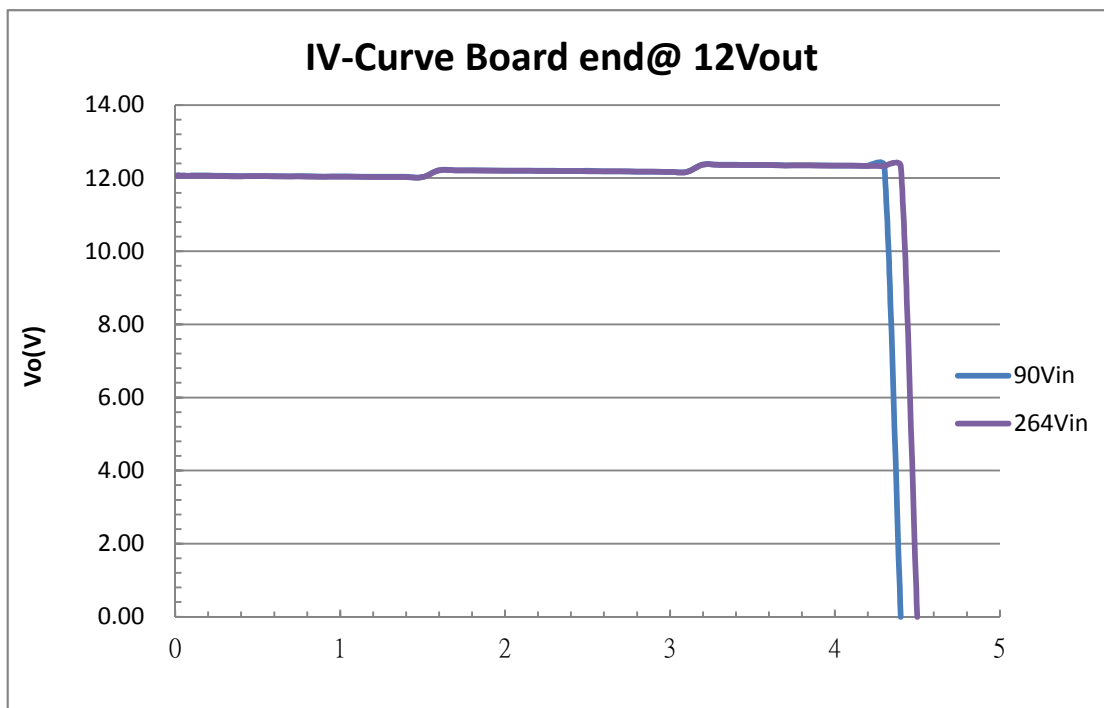


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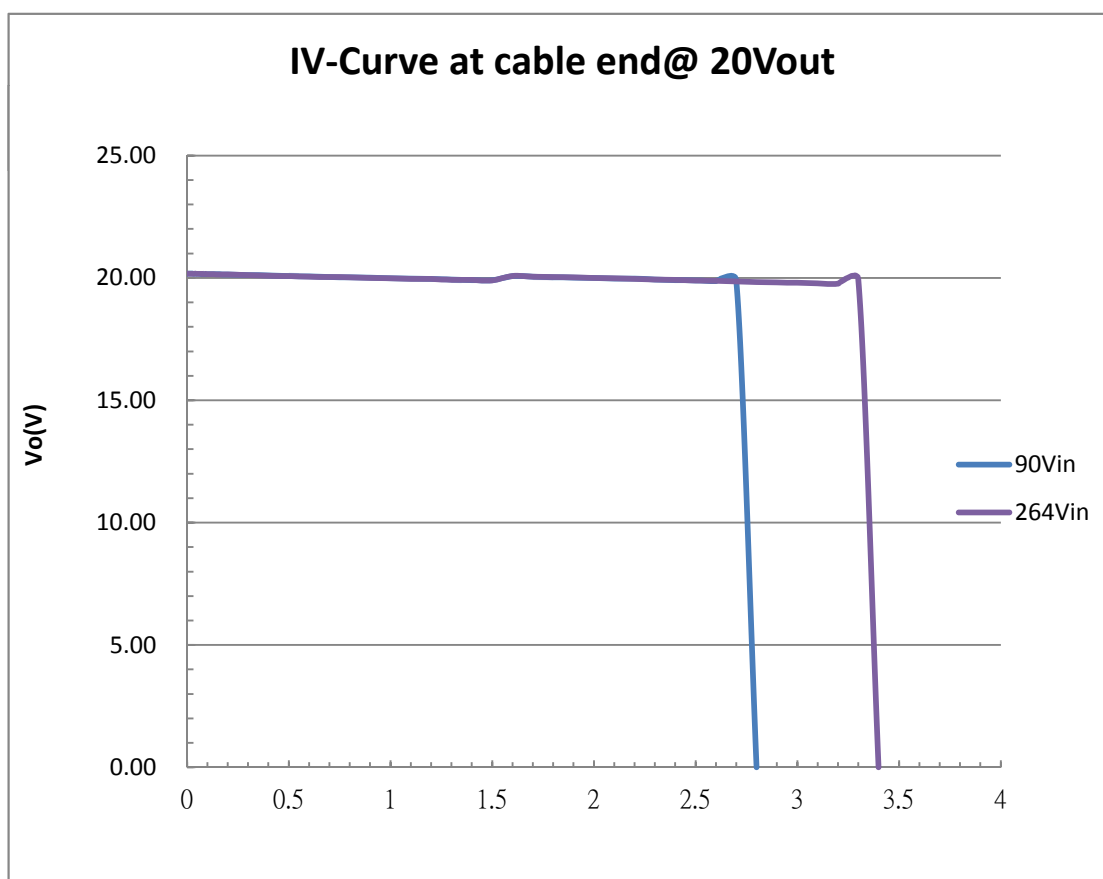
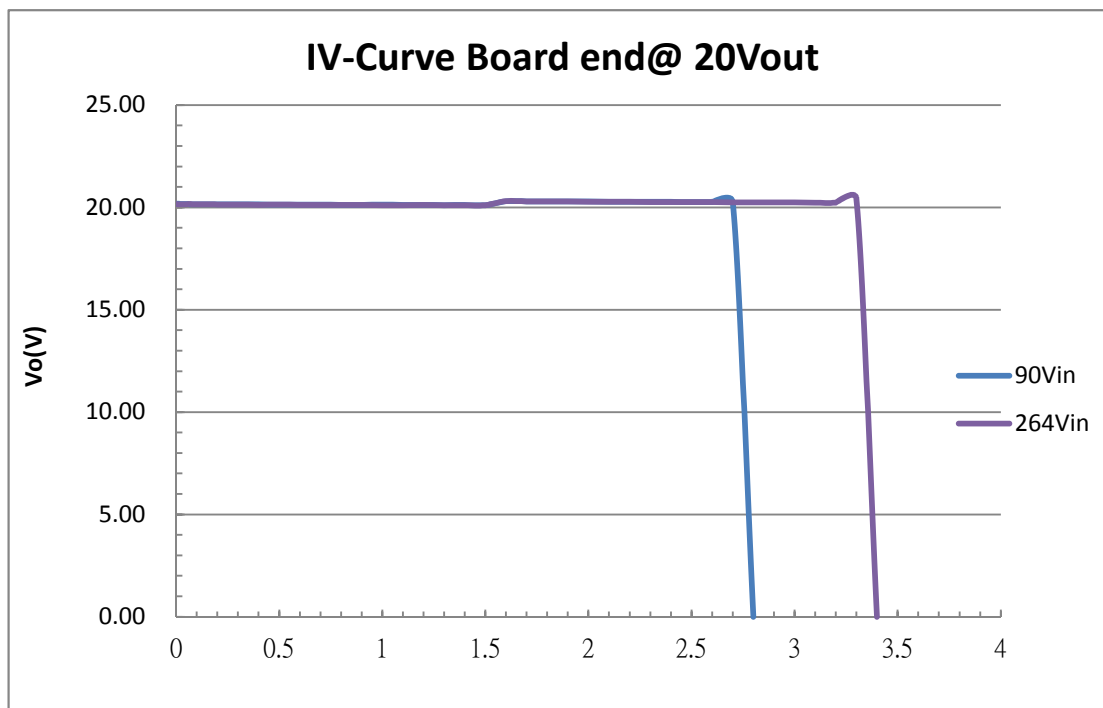
3.2.13 IV Curve



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3.2.14 Over Load Protection

When over load condition is removed and the power automatically recover.

Table 18 5Vout Over Load Protection

Input Voltage	OLP(A)	Over Rating	Remark
90Vac/60Hz	4.32	144.00%	
115Vac/60Hz	4.33	144.33%	
180Vac/50Hz	4.33	144.33%	
230Vac/50Hz	4.33	144.33%	
264Vac/50Hz	4.34	144.67%	

Table 19 9Vout Over Load Protection

Input Voltage	OLP(A)	Over Rating	Remark
90Vac/60Hz	4.33	144.33%	
115Vac/60Hz	4.33	144.33%	
180Vac/50Hz	4.33	144.33%	
230Vac/50Hz	4.34	144.67%	
264Vac/50Hz	4.34	144.67%	

Table 20 12Vout Over Load Protection

Input Voltage	OLP(A)	Over Rating	Remark
90Vac/60Hz	4.33	144.33%	
115Vac/60Hz	4.33	144.33%	
180Vac/50Hz	4.34	144.67%	
230Vac/50Hz	4.34	144.67%	
264Vac/50Hz	4.34	144.67%	

Table 21 15Vout Over Load Protection

Input Voltage	OLP(A)	Over Rating	Remark
90Vac/60Hz	3.73	124.33%	
115Vac/60Hz	4.32	144.00%	
180Vac/50Hz	4.36	145.33%	
230Vac/50Hz	4.36	145.33%	
264Vac/50Hz	4.36	145.33%	

Table 22 20Vout Over Load Protection

Input Voltage	OLP(A)	Over Rating	Remark
90Vac/60Hz	2.72	120.89%	
115Vac/60Hz	3.25	144.44%	
180Vac/50Hz	3.26	144.89%	
230Vac/50Hz	3.25	144.44%	
264Vac/50Hz	3.26	144.89%	



45W PD Power Module Using UC3875A+VP300

3.2.15 Over Voltage Protection(Add DC Voltage at Vout)

When Over Voltage Protection condition is removed and the power automatically recover.

Table 23 Over Voltage Protection

Input Voltage	Output Voltage	Output Current	OVP@ DCin(V)	Specification	Test Result	Remark
90Vac/60Hz	5V	0A	5.30	Auto Recovery	Pass	Fig.75
	12V		14.20		Pass	Fig.76
	20V		23.50		Pass	Fig.77
90Vac/60Hz	5V	3A	5.60		Pass	Fig.78
	12V		14.20		Pass	Fig.79
	20V		23.60		Pass	Fig.80
264Vac/50Hz	5V	0A	6.50		Pass	Fig.81
	12V		14.20		Pass	Fig.82
	20V		23.50		Pass	Fig.83
264Vac/50Hz	5V	3A	6.00		Pass	Fig.84
	12V		14.30		Pass	Fig.85
	20V		23.60		Pass	Fig.86

CH1: Vgs_SR, CH2:Vds_SR, CH3: Vbus, CH4: Vbus_EN

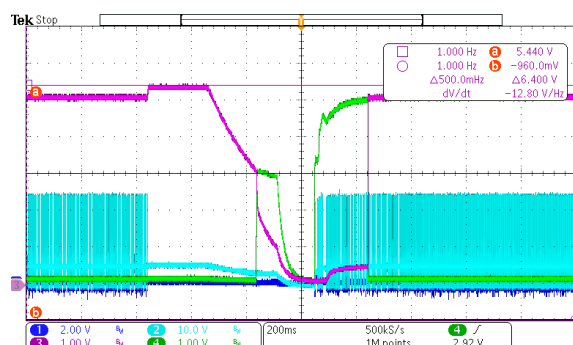


Fig.75 90Vac/60Hz; 5V; 0A; OVP

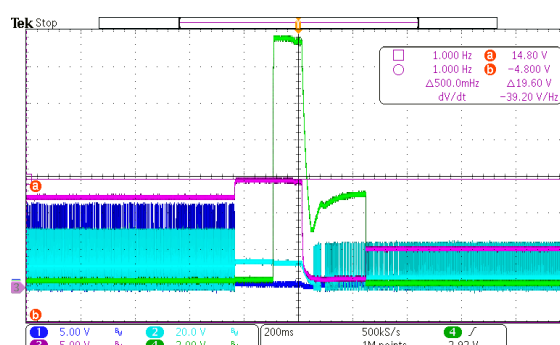


Fig.76 90Vac/60Hz; 12V; 0A; OVP

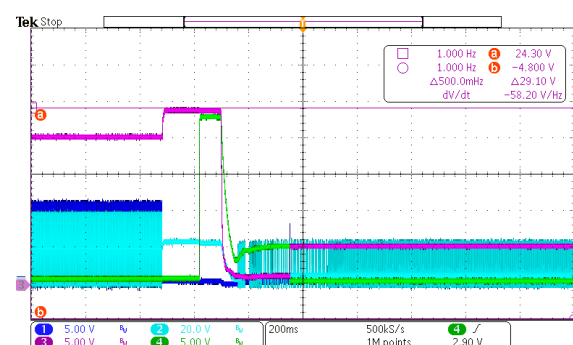


Fig.77 90Vac/60Hz; 20V; 0A; OVP

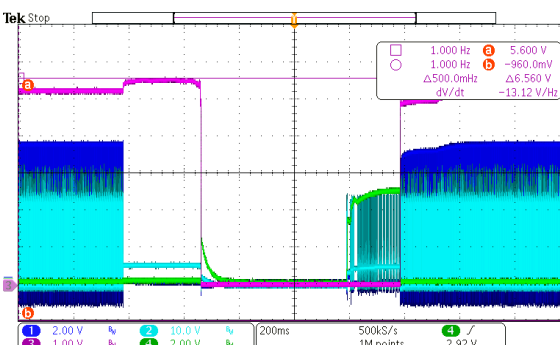


Fig.78 90Vac/60Hz; 5V; 3A; OVP



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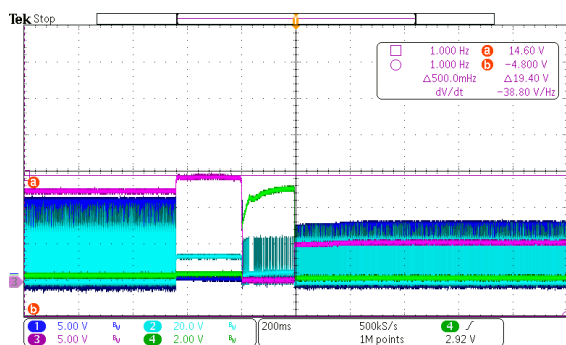


Fig.79 90Vac/60Hz; 12V; 3A; OVP

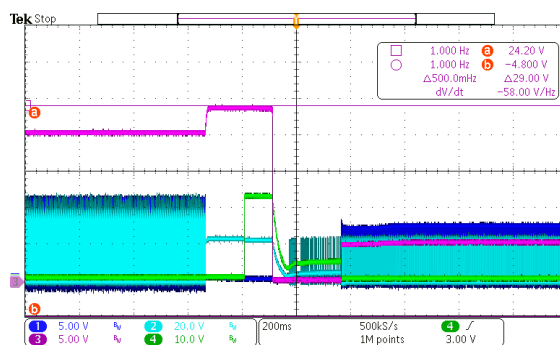


Fig.80 90Vac/60Hz; 20V; 2.25A; OVP

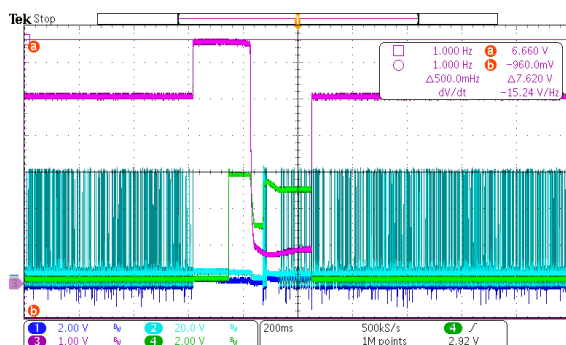


Fig.81 264Vac/50Hz; 5V; 0A; OVP

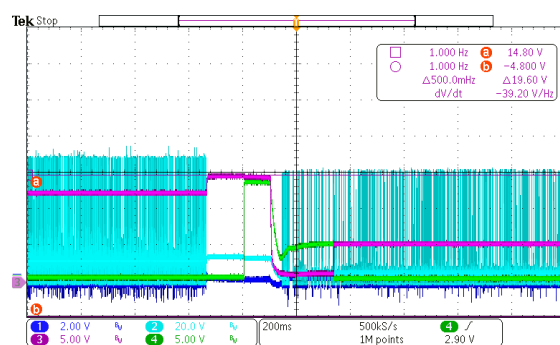


Fig.82 264Vac/50Hz; 12V; 0A; OVP

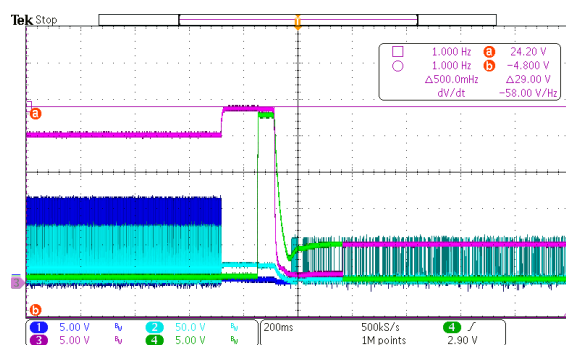


Fig.83 264Vac/50Hz; 20V; 0A; OVP

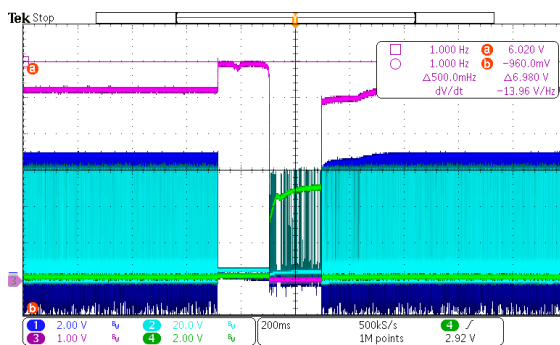


Fig.84 264Vac/50Hz; 5V; 3A; OVP

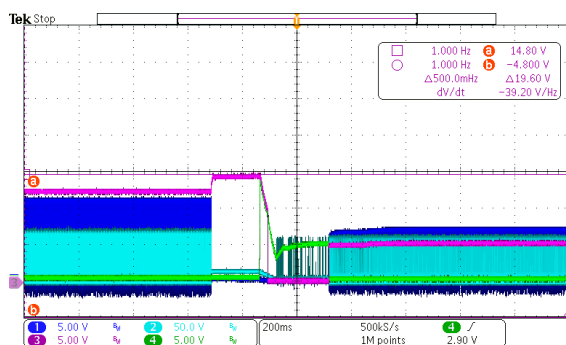


Fig.85 264Vac/50Hz; 12V; 3A; OVP

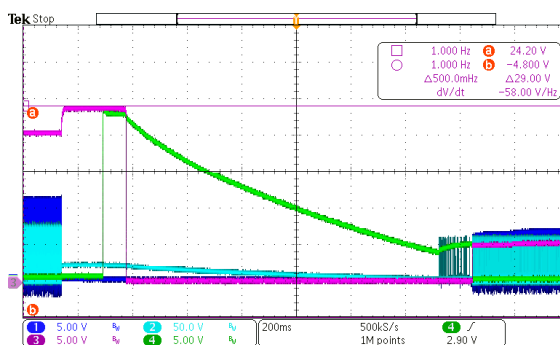


Fig.86 264Vac/50Hz; 20V; 2.25A; OVP



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3.2.16 Short Circuit Protection

When short the output voltage ,and no parts are damaged.Once Short Circuit condition is removed and the power should recover automatically .

Table 24 Short Circuit Protection

Input Voltage	Output Voltage (V)	Output Current (A)	Input Power (mW)	Specification	Test Result	Remark
90Vac/60Hz	5	0	191	Auto Recovery	Pass	Fig.87
	9	0	326		Pass	Fig.88
	12	0	326		Pass	Fig.89
	15	0	327		Pass	Fig.90
	20	0	325		Pass	Fig.91
	5	3	183		Pass	Fig.92
	9	3	339		Pass	Fig.93
	12	3	467		Pass	Fig.94
	15	3	468		Pass	Fig.95
	20	2.25	437		Pass	Fig.96
264Vac/50Hz	5	0	225		Pass	Fig.97
	9	0	292		Pass	Fig.98
	12	0	284		Pass	Fig.99
	15	0	220		Pass	Fig.100
	20	0	247		Pass	Fig.101
	5	3	209		Pass	Fig.102
	9	3	217		Pass	Fig.103
	12	3	220		Pass	Fig.104
	15	3	232		Pass	Fig.105
	20	2.25	212		Pass	Fig.106

CH1:Vgs_SR, CH2:Vds_SR, CH3: Vbus, CH4: Vbus_EN

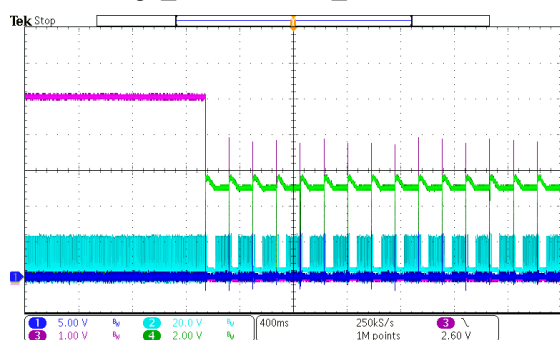


Fig.87 90Vac/60Hz; 5V; 0A; Output Short

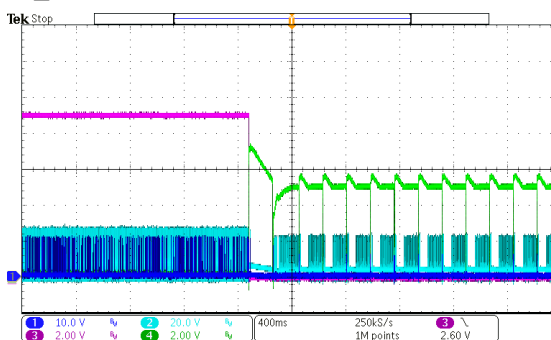


Fig.88 90Vac/60Hz; 9V; 0A; Output Short



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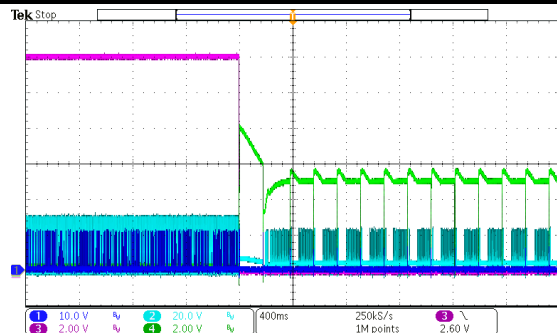


Fig. 89 90Vac/60Hz; 12V; 0A; Output Short

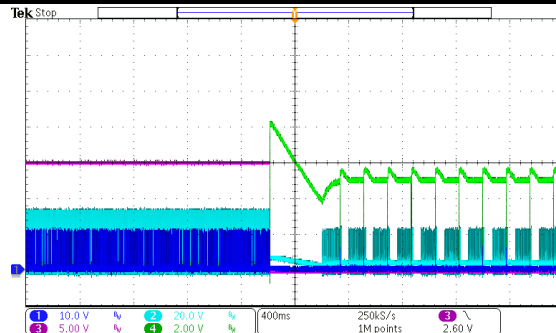


Fig. 90 90Vac/60Hz; 15V; 0A; Output Short

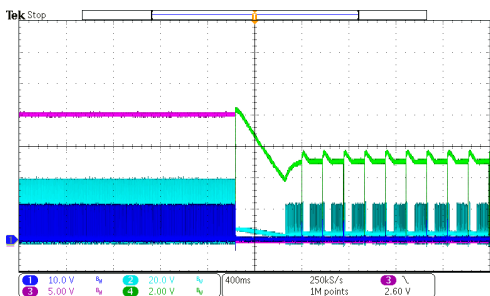


Fig. 91 90Vac/60Hz; 20V; 0A; Output Short

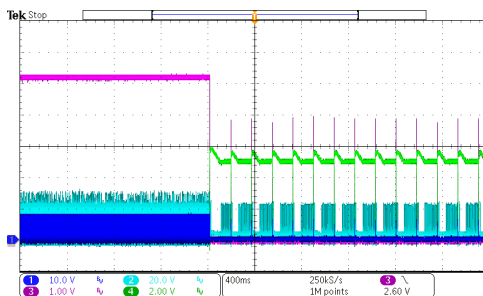


Fig. 92 90Vac/60Hz; 5V; 3A; Output Short

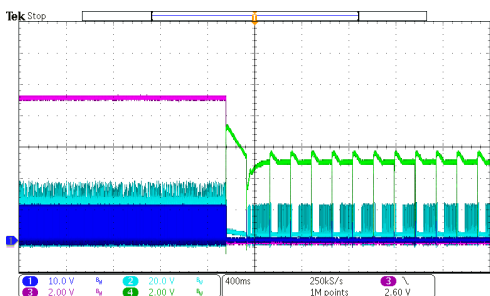


Fig. 93 90Vac/60Hz; 9V; 3A; Output Short

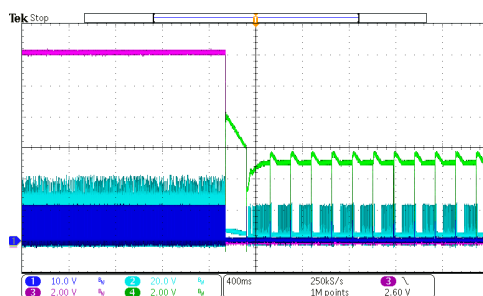


Fig. 94 90Vac/60Hz; 12V; 3A; Output Short

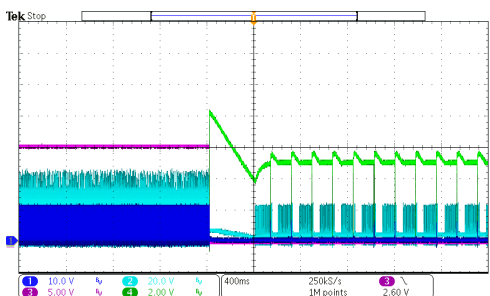


Fig. 95 90Vac/60Hz; 15V; 3A; Output Short

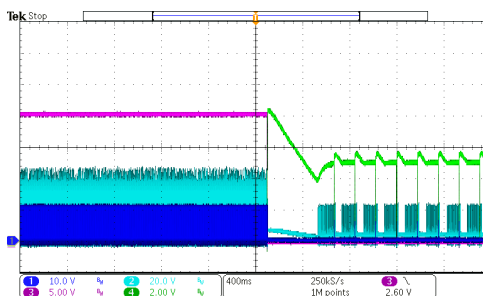


Fig. 96 90Vac/60Hz; 20V; 2.25A; Output Short



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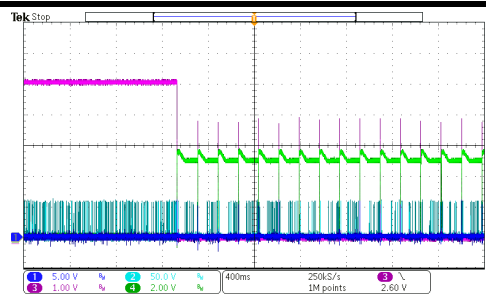


Fig.97 264Vac/50Hz; 5V; 0A; Output Short

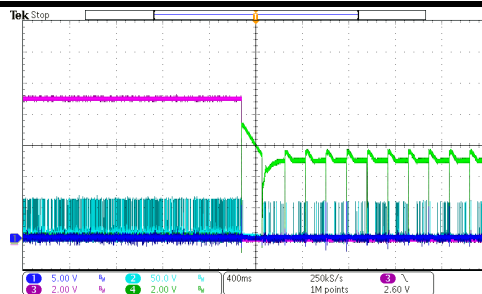


Fig.98 264Vac/50Hz; 9V; 0A; Output Short

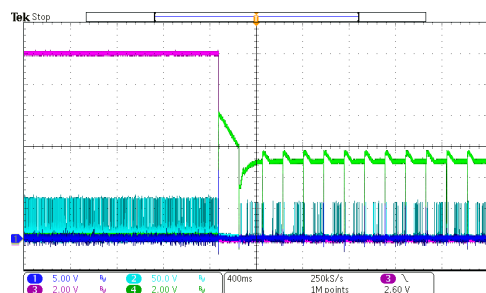


Fig.99 264Vac/50Hz; 12V; 0A; Output Short

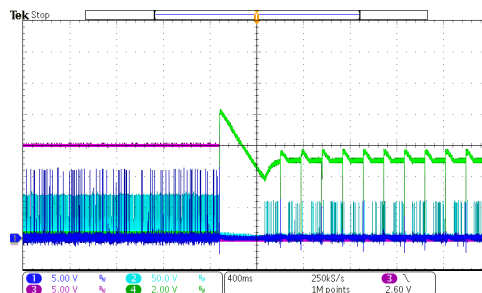


Fig.100 264Vac/50Hz; 15V; 0A; Output Short

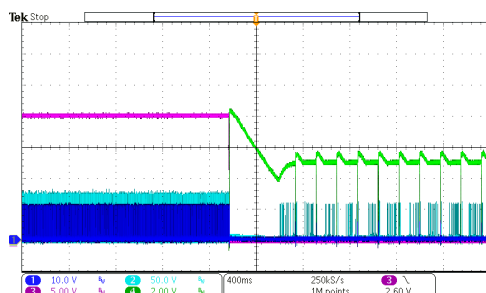


Fig.101 264Vac/50Hz; 20V; 0A; Output Short

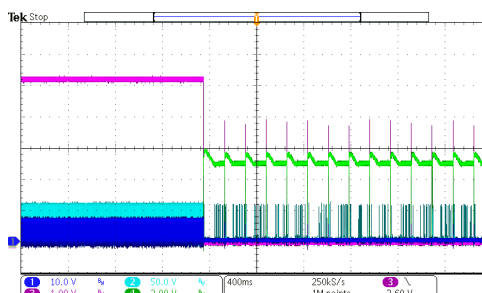


Fig.102 264Vac/50Hz; 5V; 3A; Output Short

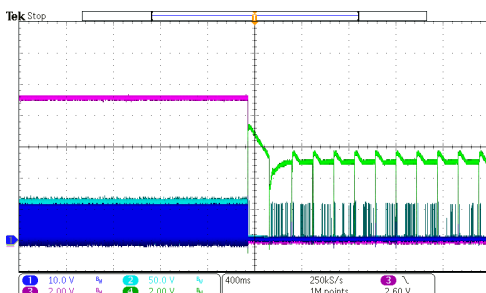


Fig.103 264Vac/50Hz; 9V; 3A; Output Short

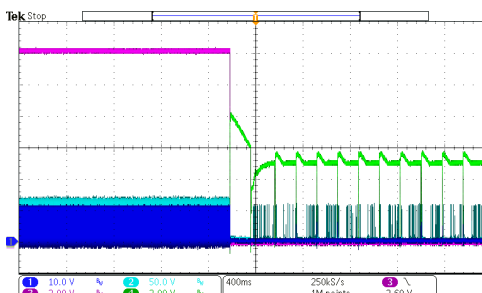


Fig.104 264Vac/50Hz; 12V; 3A; Output Short

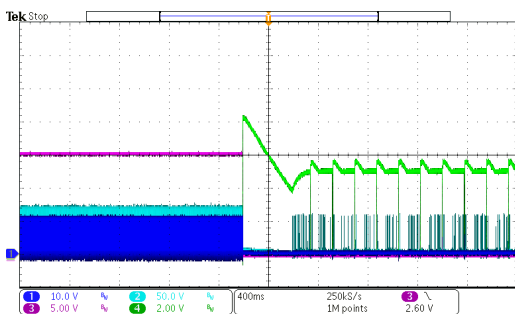


Fig.105 264Vac/50Hz; 15V; 3A; Output Short

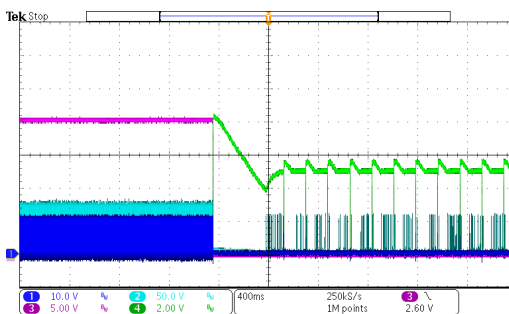


Fig.106 264Vac/50Hz; 20V; 2.25A; Output Short



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3.2.17 Thermal Testing

Table 25 Thermal Testing Power On Continue 3 Hours Later at open frame

Input Voltage	AMB	BD1(°C)	LF2 Core(°C)	LF2 Wire(°C)	C1(°C)	Q2-1(°C)
90Vac/60Hz	25°C	73	58	57	56	74
264Vac/50Hz		44	41	41	42	62

Input Voltage	AMB	Q1(°C)	Q3(°C)	T1 Core(°C)	T1 Wire(°C)	U3(°C)
90Vac/60Hz	25°C	61	52	71	65	61
264Vac/50Hz		51	56	78	62	62

Input Voltage	AMB	Q4(°C)	U2(°C)	U1(°C)		
90Vac/60Hz	25°C	55	57	62		
264Vac/50Hz		56	62	52		



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4. Other Important Waveforms

4.1. Switching Frequency.

Table 26 Measure 25%, 50%, 75%, 100% Load, Q1&Q3 Switching Frequency @ 115Vac input.

Input Voltage	Output Voltage	Output Load	Q1 Vds Frequency	Remark
115Vac/60Hz	5V	25% Load	26.81KHz	Fig.107
		50% Load	36.23KHz	Fig.108
		75% Load	46.30KHz	Fig.109
		100% Load	59.17KHz	Fig.110
	9V	25% Load	35.71KHz	Fig.111
		50% Load	51.81KHz	Fig.112
		75% Load	66.23KHz	Fig.113
		100% Load	77.88KHz	Fig.114
	12V	25% Load	38.31KHz	Fig.115
		50% Load	62.03KHz	Fig.116
		75% Load	77.88KHz	Fig.117
		100% Load	83.89KHz	Fig.118
	15V	25% Load	44.25KHz	Fig.119
		50% Load	69.83KHz	Fig.120
		75% Load	82.51KHz	Fig.121
		100% Load	86.81KHz	Fig.122
	20V	25% Load	46.51KHz	Fig.123
		50% Load	70.42KHz	Fig.124
		75% Load	80.65KHz	Fig.125
		100% Load	83.89KHz	Fig.126



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Table 27 Measure 25%, 50%, 75%, 100% Load, Q1&Q3 Switching Frequency @ 230Vac input.

Input Voltage	Output Voltage	Output Load	Q1 Vds Frequency	Remark
230Vac/50Hz	5V	25% Load	26.67KHz	Fig.127
		50% Load	35.34KHz	Fig.128
		75% Load	39.22KHz	Fig.129
		100% Load	49.26KHz	Fig.130
	9V	25% Load	34.48KHz	Fig.131
		50% Load	42.02KHz	Fig.132
		75% Load	56.43KHz	Fig.133
		100% Load	69.06KHz	Fig.134
	12V	25% Load	34.60KHz	Fig.135
		50% Load	53.48KHz	Fig.136
		75% Load	67.39KHz	Fig.137
		100% Load	77.40KHz	Fig.138
	15V	25% Load	38.31KHz	Fig.139
		50% Load	60.68KHz	Fig.140
		75% Load	76.92KHz	Fig.141
		100% Load	84.75KHz	Fig.142
	20V	25% Load	38.76KHz	Fig.143
		50% Load	72.89KHz	Fig.144
		75% Load	81.97KHz	Fig.145
		100% Load	83.33KHz	Fig.146



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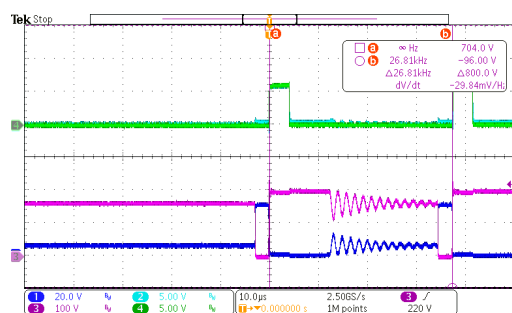


Fig.107 115Vac/60Hz; 5V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

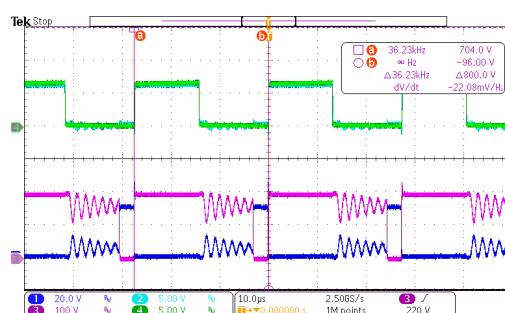


Fig.108 115Vac/60Hz; 5V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

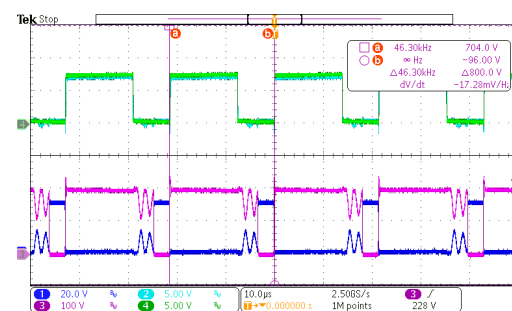


Fig.109 115Vac/60Hz; 5V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

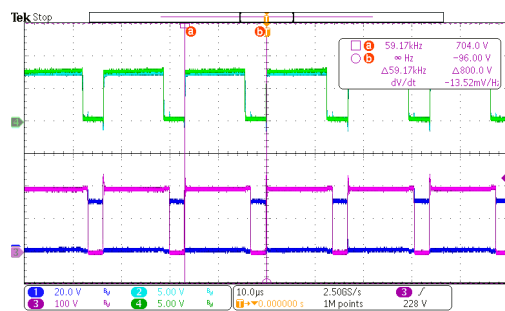


Fig.110 115Vac/60Hz; 5V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

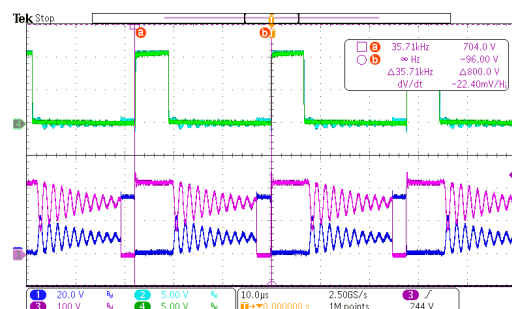


Fig.111 115Vac/60Hz; 9V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

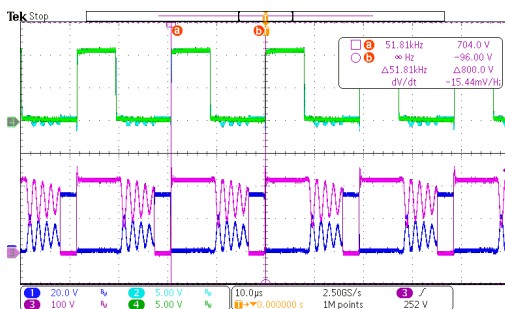


Fig.112 115Vac/60Hz; 9V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

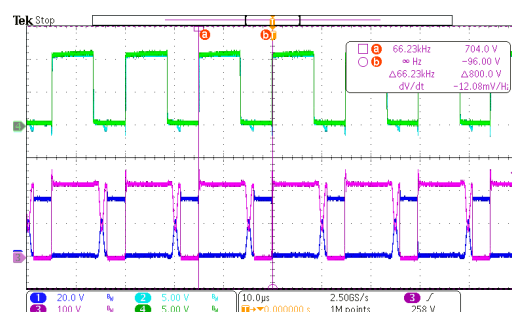


Fig.113 115Vac/60Hz; 9V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

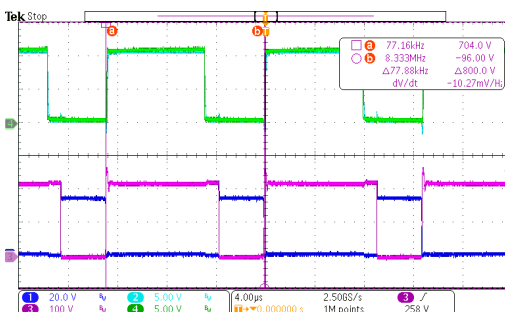


Fig.114 115Vac/60Hz; 9V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

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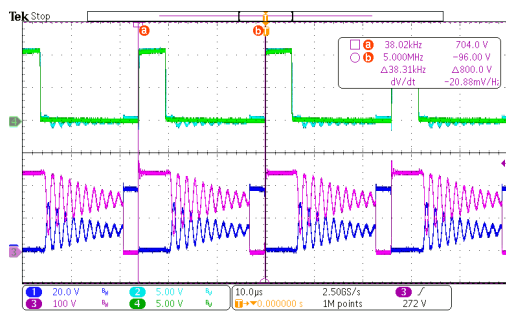


Fig.115 115Vac/60Hz; 12V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

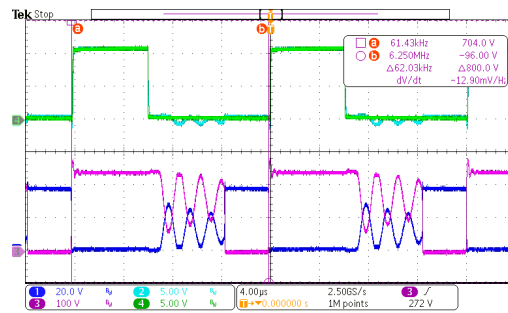


Fig.116 115Vac/60Hz; 12V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

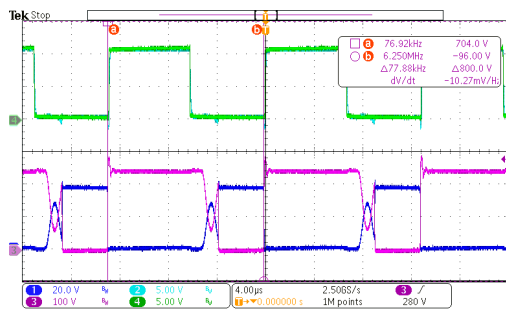


Fig.117 115Vac/60Hz; 12V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

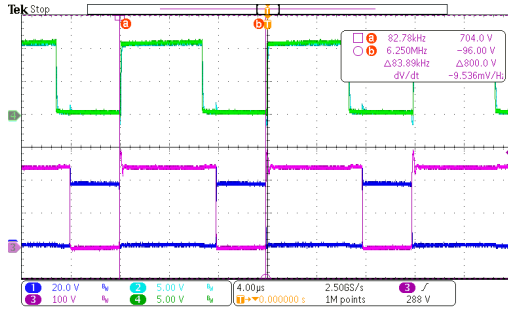


Fig.118 115Vac/60Hz; 12V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

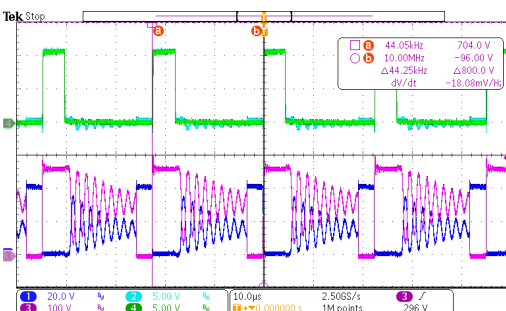


Fig.119 115Vac/60Hz; 15V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

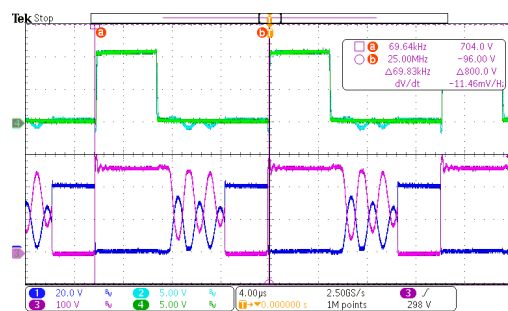


Fig.120 115Vac/60Hz; 15V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

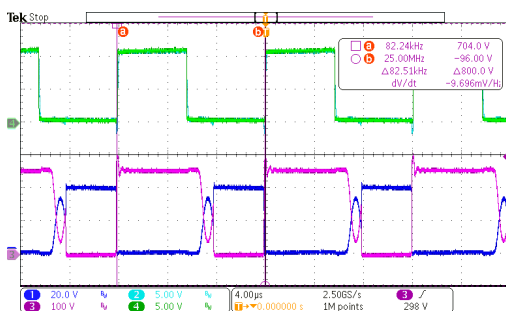


Fig.121 115Vac/60Hz; 15V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

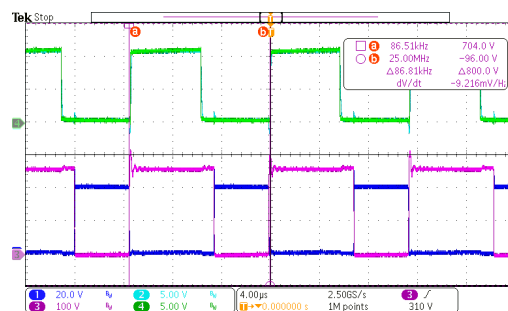


Fig.122 115Vac/60Hz; 15V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.



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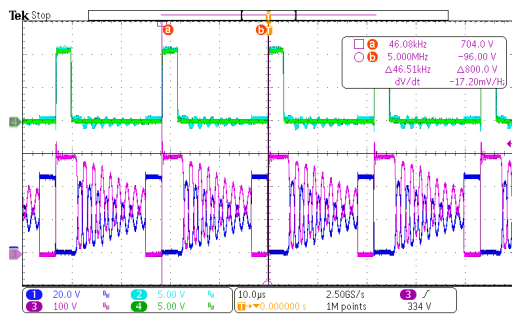


Fig.123 115Vac/60Hz; 20V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

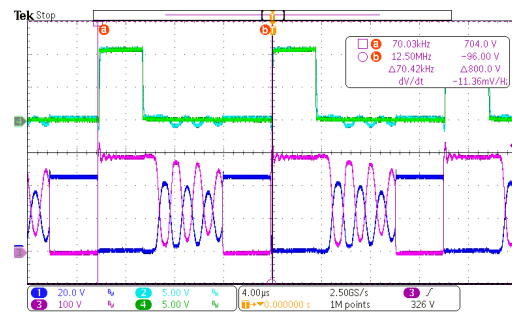


Fig.124 115Vac/60Hz; 20V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

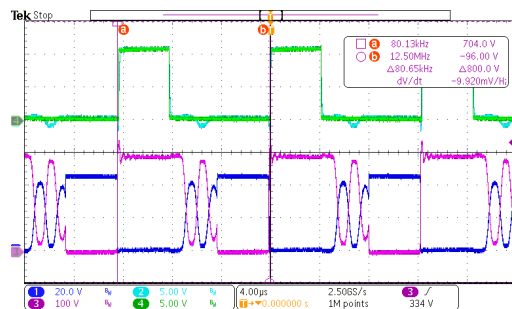


Fig.125 115Vac/60Hz; 20V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

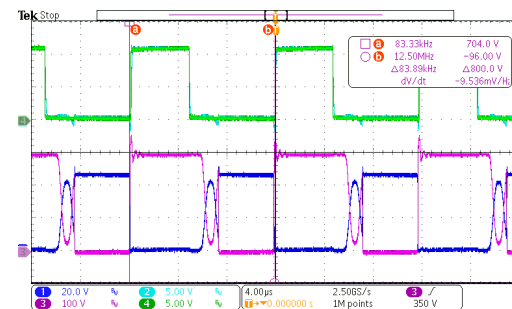


Fig.126 115Vac/60Hz; 20V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

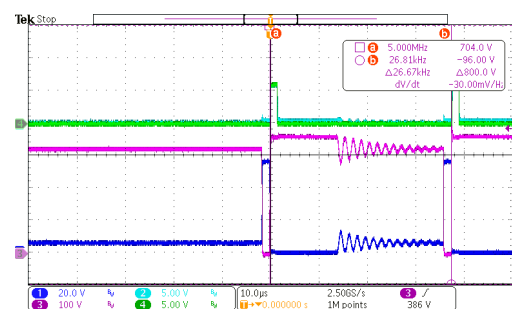


Fig.127 230Vac/50Hz; 5V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

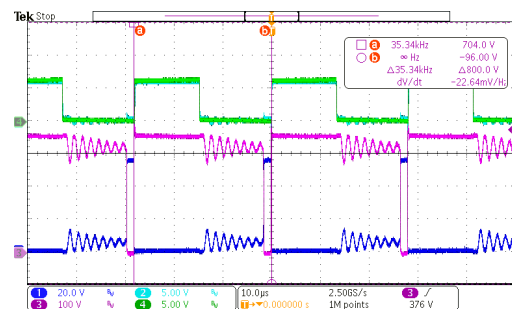


Fig.128 230Vac/50Hz; 5V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

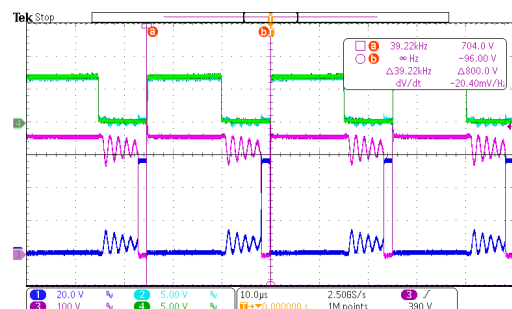


Fig.129 230Vac/50Hz; 5V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.



Fig.130 230Vac/50Hz; 5V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

45W PD Power Module Using UC3875A+VP300

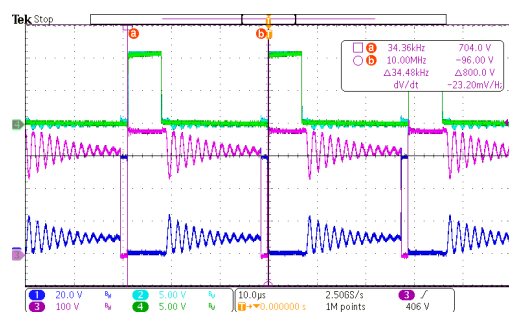


Fig.131 230Vac/50Hz; 9V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

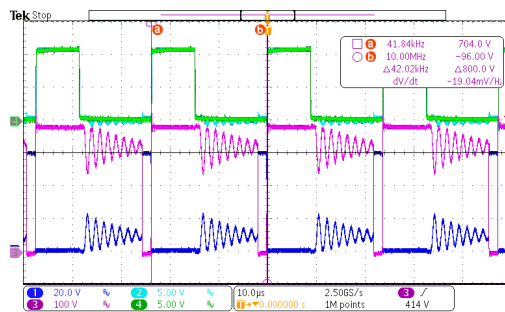


Fig.132 230Vac/50Hz; 9V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

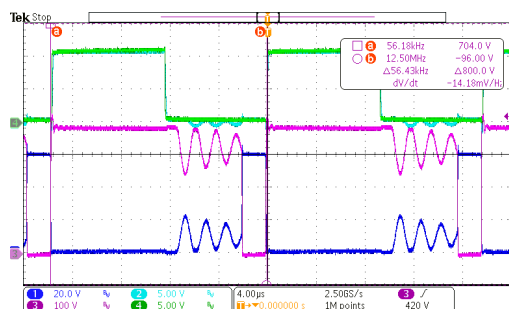


Fig.133 230Vac/50Hz; 9V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

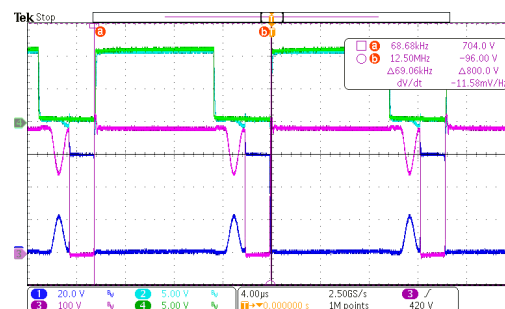


Fig.134 230Vac/50Hz; 9V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

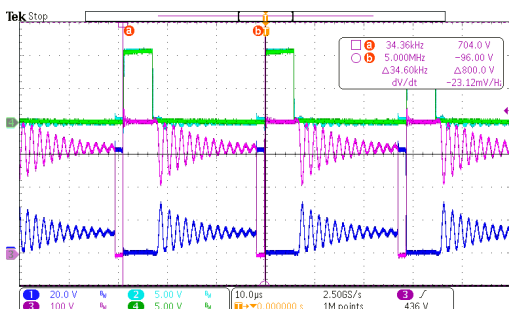


Fig.135 230Vac/50Hz; 12V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

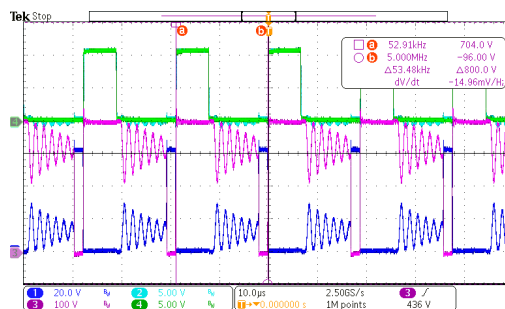


Fig.136 230Vac/50Hz; 12V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

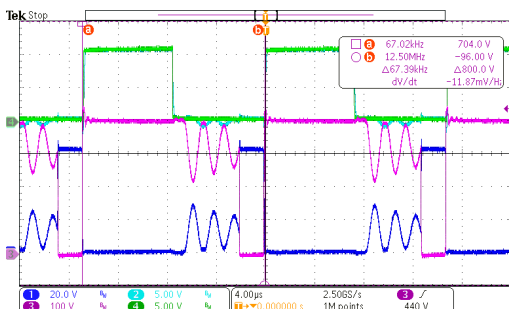


Fig.137 230Vac/50Hz; 12V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

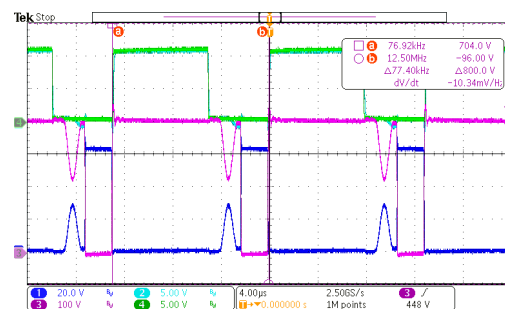


Fig.138 230Vac/50Hz; 12V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.



45W PD Power Module Using UC3875A+VP300

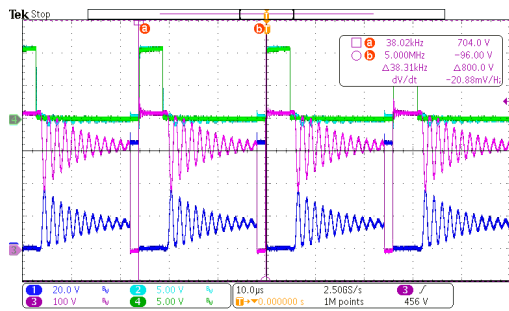


Fig.139 230Vac/50Hz; 15V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

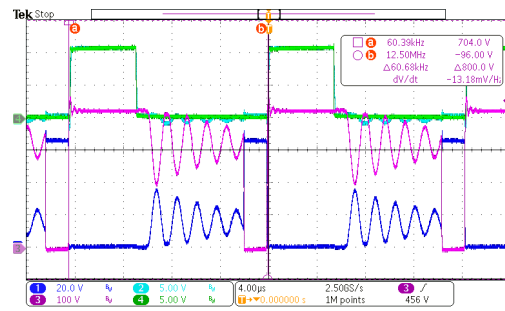


Fig.140 230Vac/50Hz; 15V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

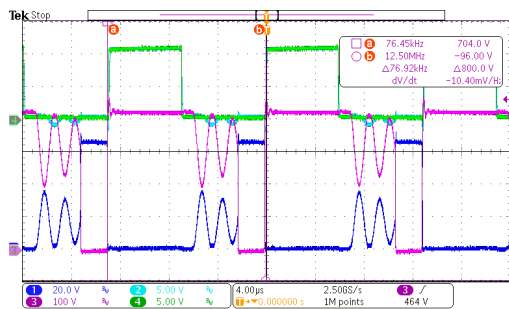


Fig.141 230Vac/50Hz; 15V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

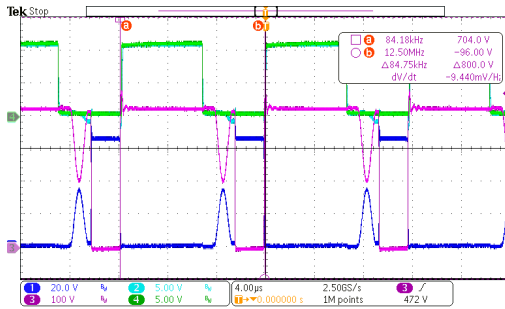


Fig.142 230Vac/50Hz; 15V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

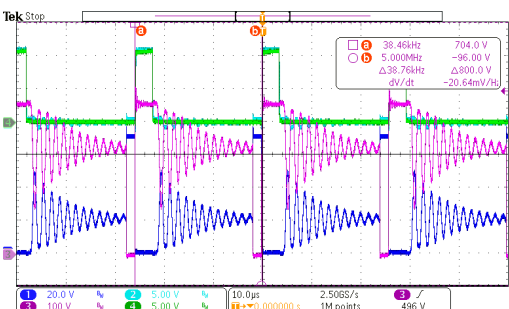


Fig.143 230Vac/50Hz; 20V; 25% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

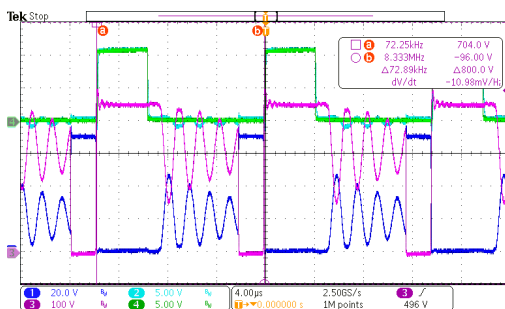


Fig.144 230Vac/50Hz; 20V; 50% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

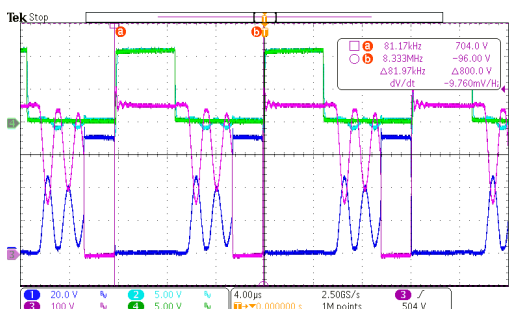


Fig.145 230Vac/50Hz; 20V; 75% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: Q1 Vds. Ch4: SR IC VG.

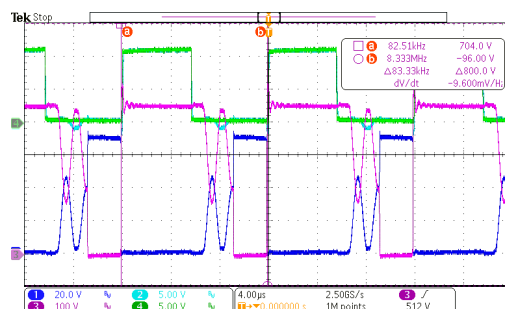


Fig.146 230Vac/50Hz; 20V; 100% Load, Ch1: SR MOS Drain. Ch2: SR MOS Gate. Ch3: U1 Vds. Ch4: SR IC VG.

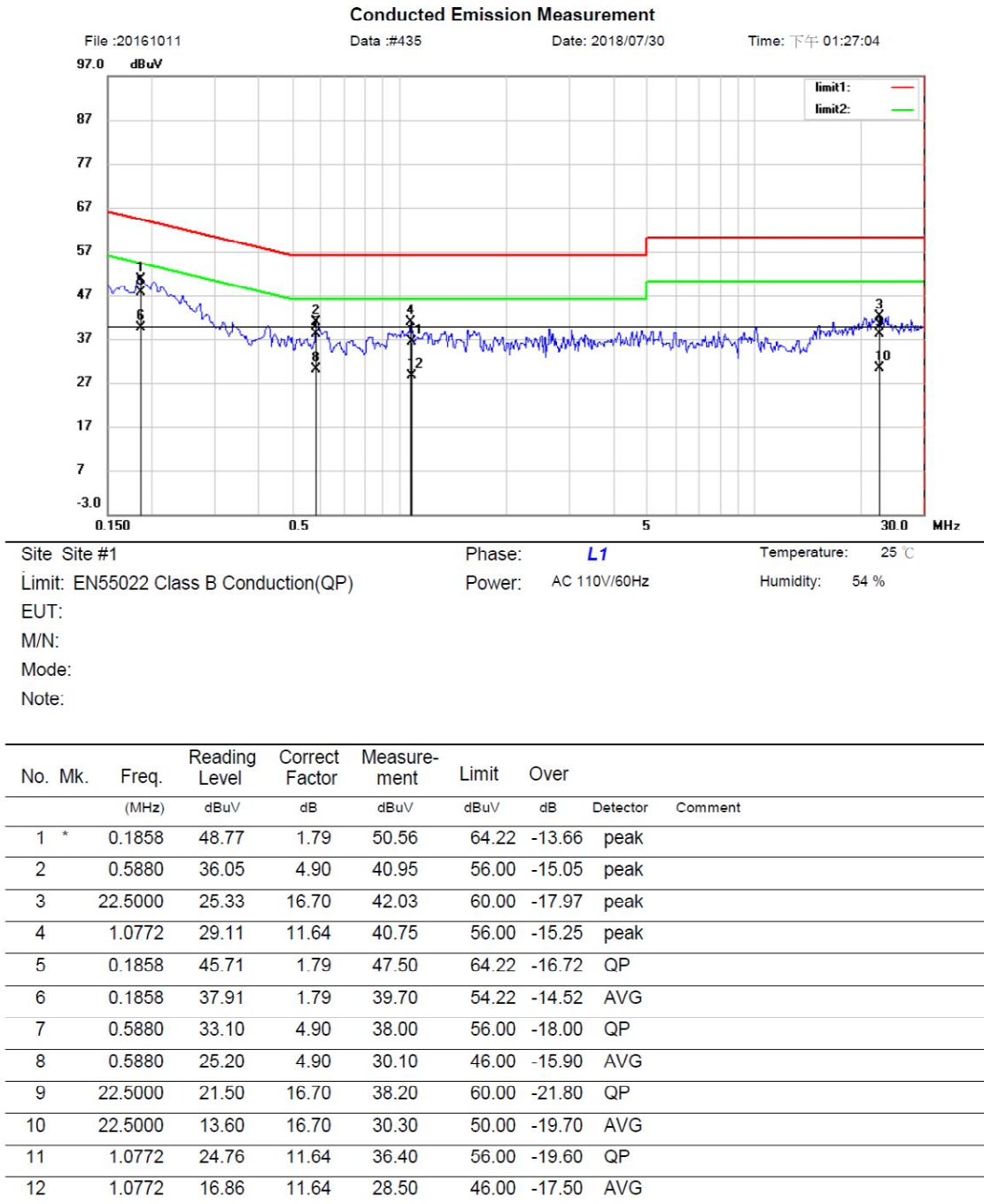


45W PD Power Module Using UC3875A+VP300

5. EMI test@ 5V out

5.1 Conduction

5.1.1 input 110VAC/60HZ Line

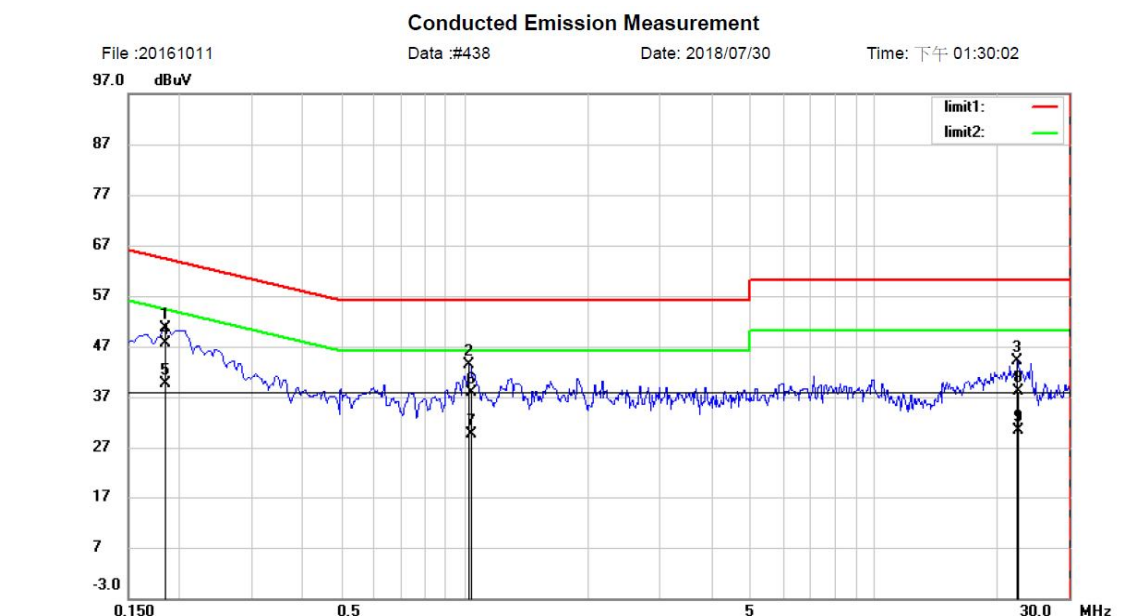


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45W PD Power Module Using UC3875A+VP300

5.1.2 input 110VAC/60HZ Neutral



Site Site #1

Phase: **N**

Temperature: 25 °C

Limit: EN55022 Class B Conduction(QP)

Power: AC 110V/60Hz

Humidity: 54 %

EUT:

M/N:

Mode:

Note:

No.	Mk.	Freq. (MHz)	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1842	48.83	1.79	50.62	64.29	-13.67	peak	
2	*	1.0283	31.58	11.72	43.30	56.00	-12.70	peak	
3		22.4457	27.32	16.70	44.02	60.00	-15.98	peak	
4		0.1842	45.71	1.79	47.50	64.29	-16.79	QP	
5		0.1842	37.91	1.79	39.70	54.29	-14.59	AVG	
6		1.0283	26.08	11.72	37.80	56.00	-18.20	QP	
7		1.0283	17.98	11.72	29.70	46.00	-16.30	AVG	
8		22.4457	21.50	16.70	38.20	60.00	-21.80	QP	
9		22.4457	13.70	16.70	30.40	50.00	-19.60	AVG	

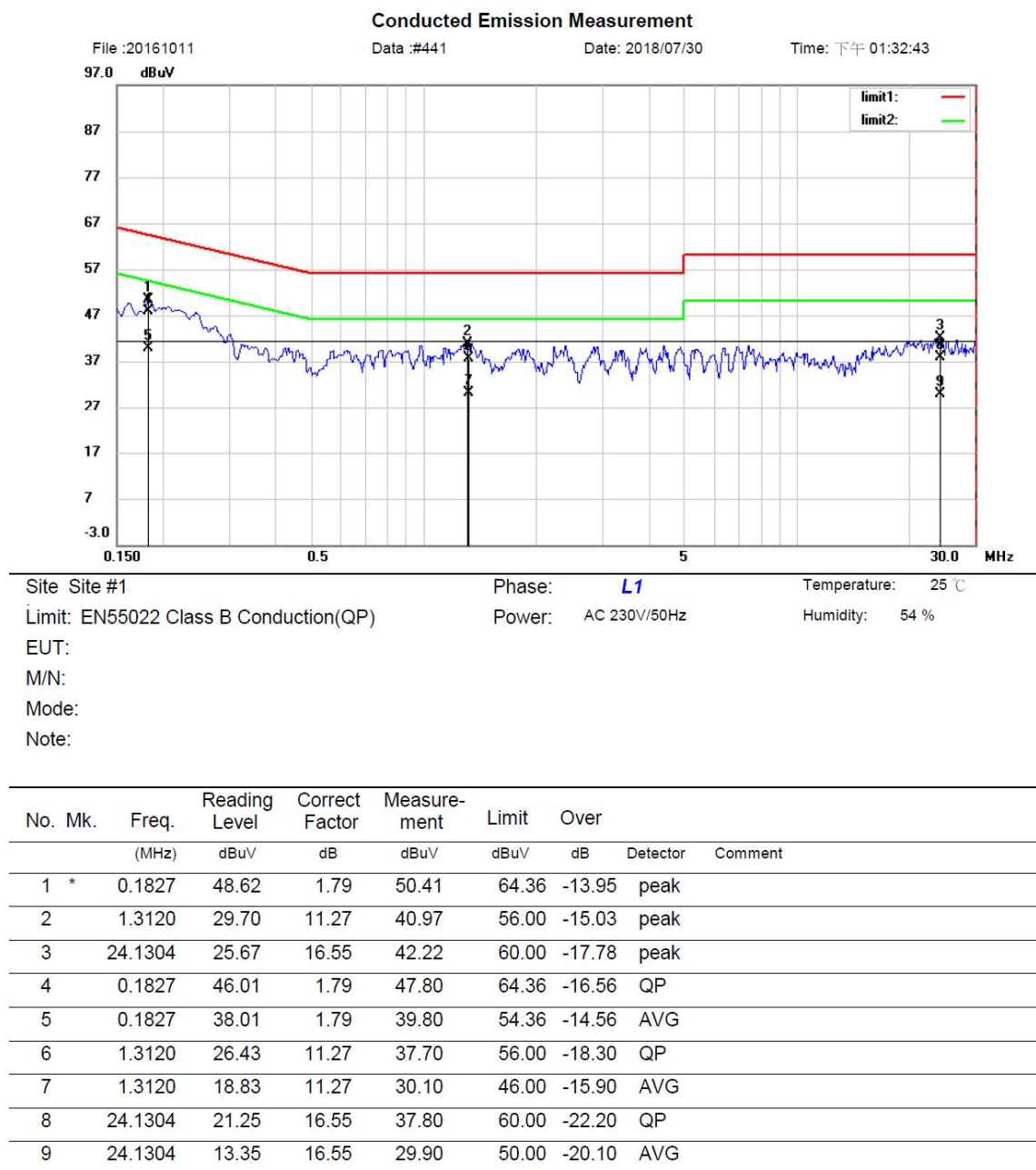


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45W PD Power Module Using UC3875A+VP300

5.1.3 input 220VAC/50HZ Line

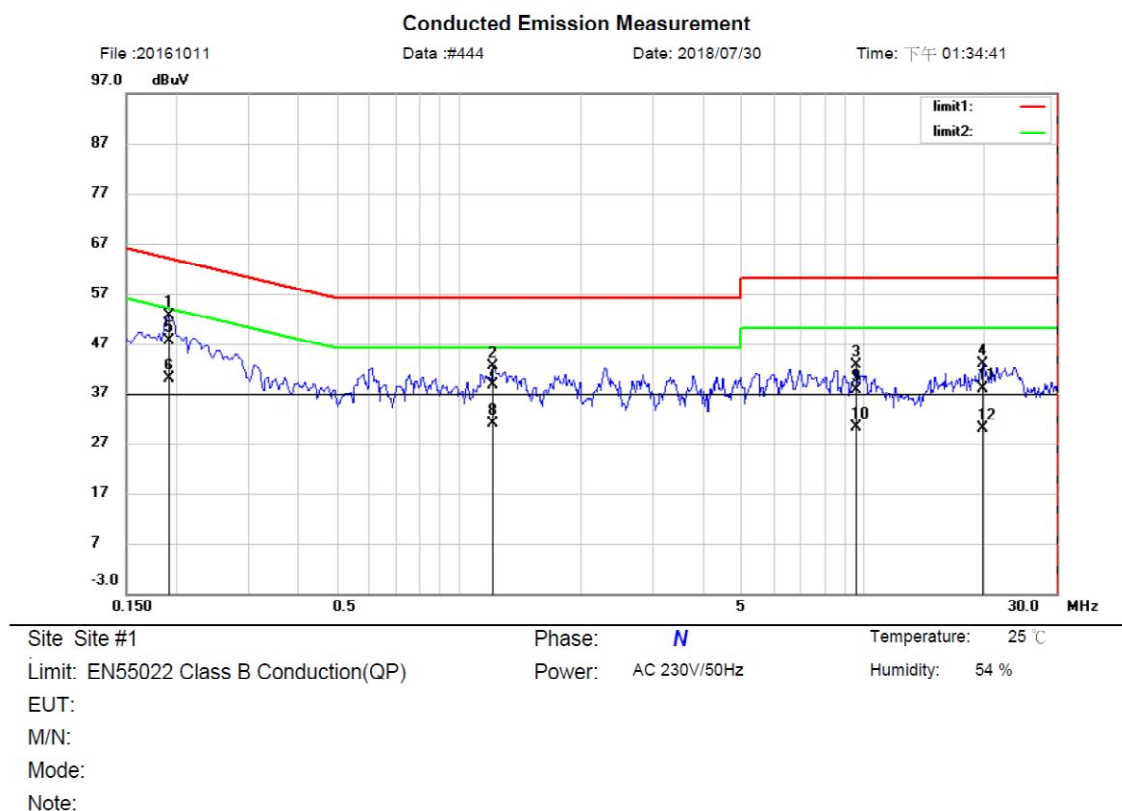


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45W PD Power Module Using UC3875A+VP300

5.1.4 input 220VAC/50HZ Neutral



No.	Mk.	Freq. (MHz)	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1918	50.85	1.79	52.64	63.96	-11.32	peak	
2		1.2141	30.81	11.44	42.25	56.00	-13.75	peak	
3		9.5652	30.56	11.99	42.55	60.00	-17.45	peak	
4		19.7826	26.33	16.52	42.85	60.00	-17.15	peak	
5		0.1918	45.71	1.79	47.50	63.96	-16.46	QP	
6		0.1918	38.01	1.79	39.80	53.96	-14.16	AVG	
7		1.2141	27.16	11.44	38.60	56.00	-17.40	QP	
8		1.2141	19.36	11.44	30.80	46.00	-15.20	AVG	
9		9.5652	25.51	11.99	37.50	60.00	-22.50	QP	
10		9.5652	18.11	11.99	30.10	50.00	-19.90	AVG	
11		19.7826	21.28	16.52	37.80	60.00	-22.20	QP	
12		19.7826	13.38	16.52	29.90	50.00	-20.10	AVG	



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