

# 方案调试与验证报告

---For DVD/DVB Case

AE&FAE Department

Version:1.1

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Test Item:

1:Load Regulation;

2:Line Regulation;

3:Output Ripple Voltage;

4:Efficiency;

5:Frequency;

6:OCP;

7:Thermal;

8:OTP;

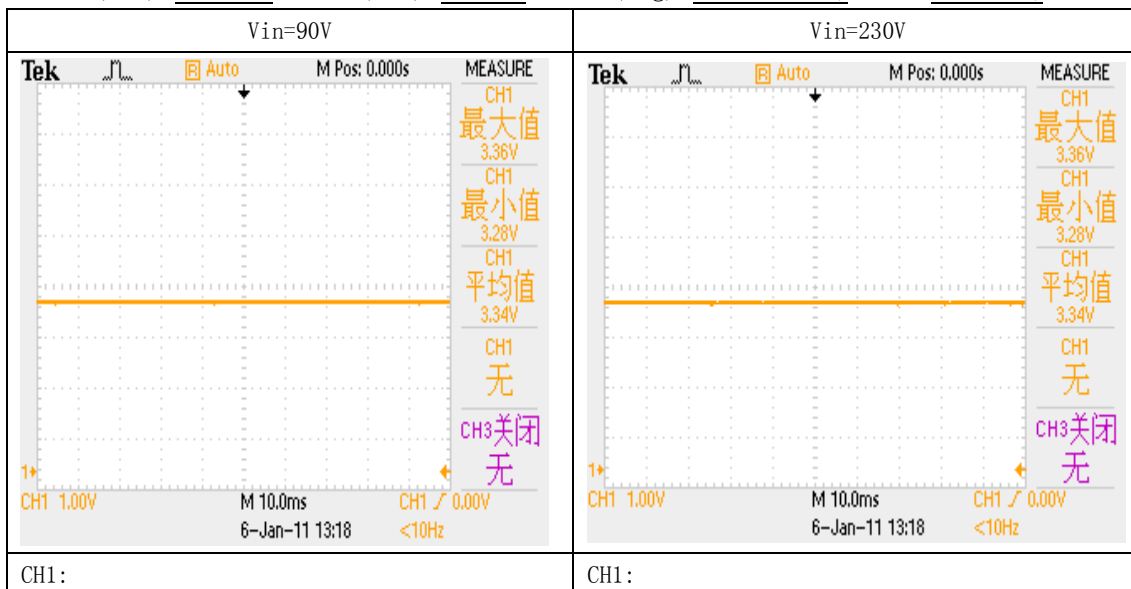
9:OSP;

10:Diode Drop Voltage;

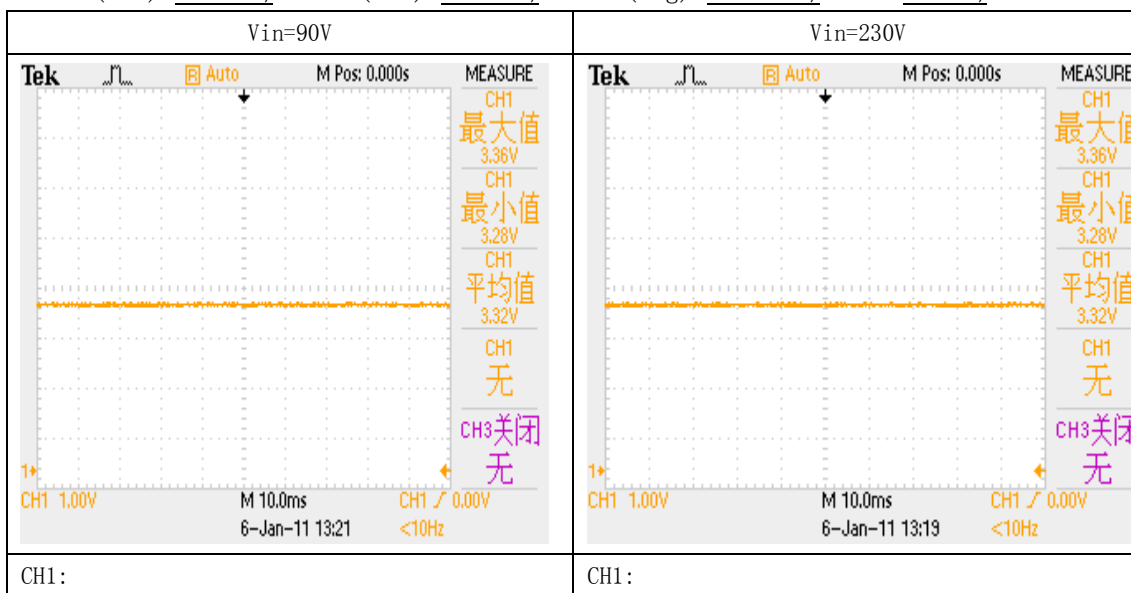
1: Load Regulation;

Test Condition: Iout2 满载、Iout3 满载; 改变 Iout1 负载;

Vout1(max)= 3.36V Vout1(min)= 3.28V Vout1(avg)= 3.34V ; Iout1=0.75mA ;



Vout1(max)= 3.36V; Vout1(min)= 3.32V; Vout1(avg)= 3.28V ; Iout1= 1.5A;

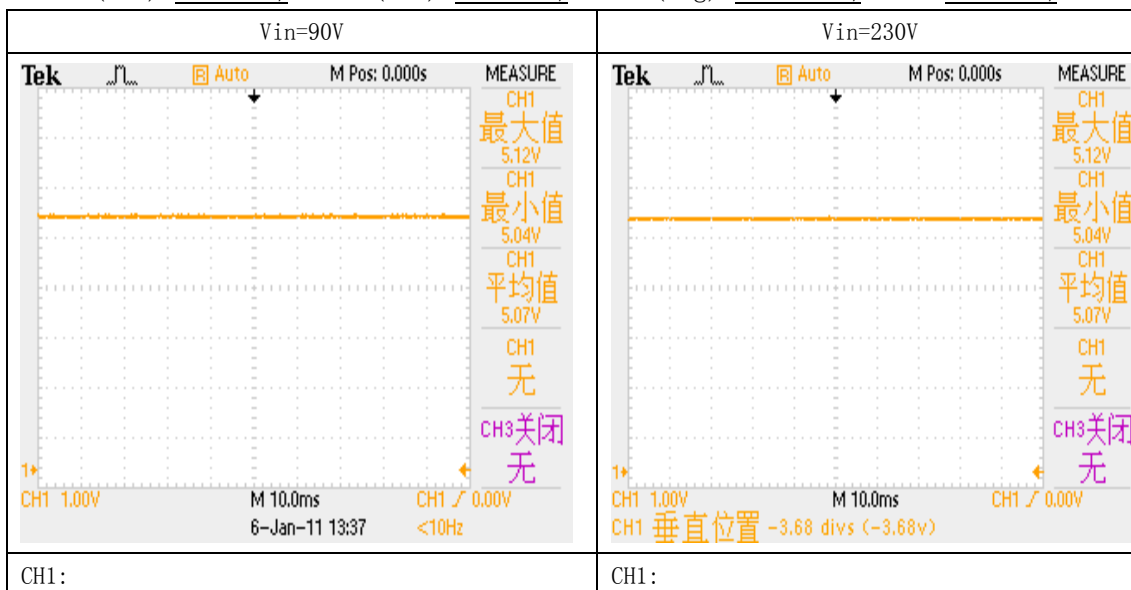


$$\text{Load Regulation} = \frac{V_0 - V_1}{V_0} = 1.8\% ;$$

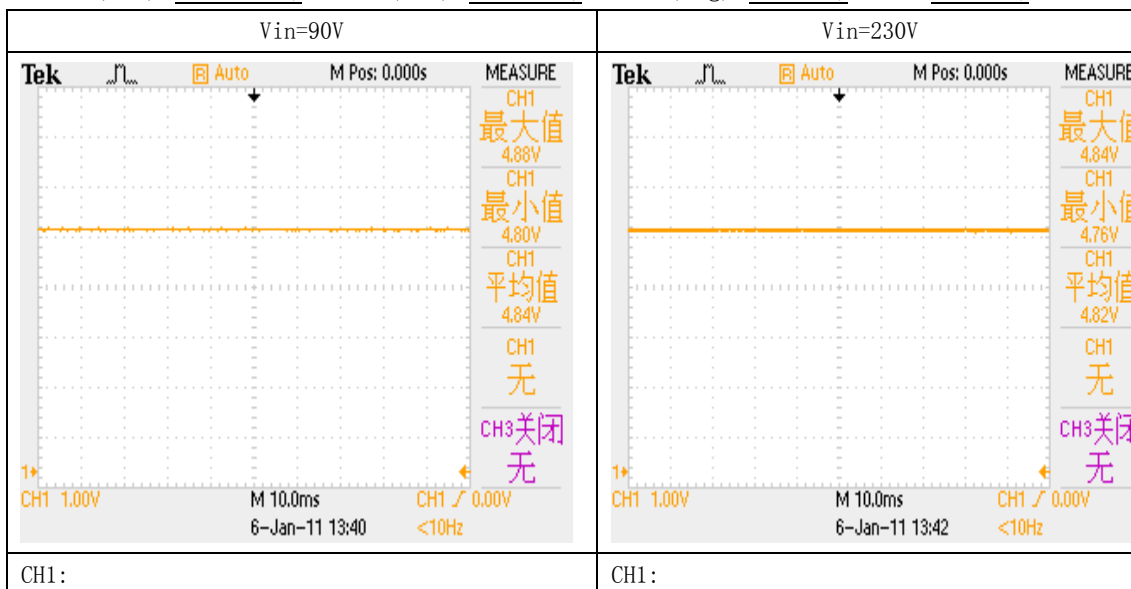
Note: Iout1 > Iout2 > Iout3;

Test Condition: Iout1 满载、Iout3 满载; 改变 Iout2 负载;

Vout2(max)= 5.12V ; Vout2(min)= 5.04V ; Vout2(avg)= 5.07V ; Iout2= 235mA ;



Vout2(max)= 4.88V ; Vout2(min)= 4.76V ; Vout2(avg)= 4.82V; Iout2= 470mA;

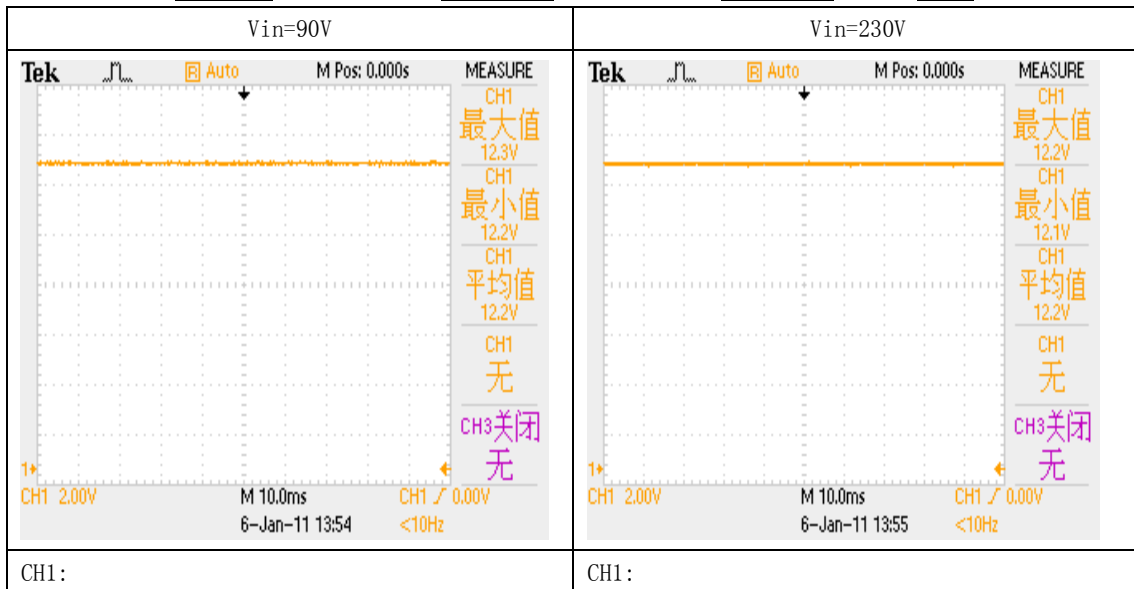


$$\text{Load Regulation}_2 = \frac{V_0 - V_1}{V_0} = \underline{4.8\%};$$

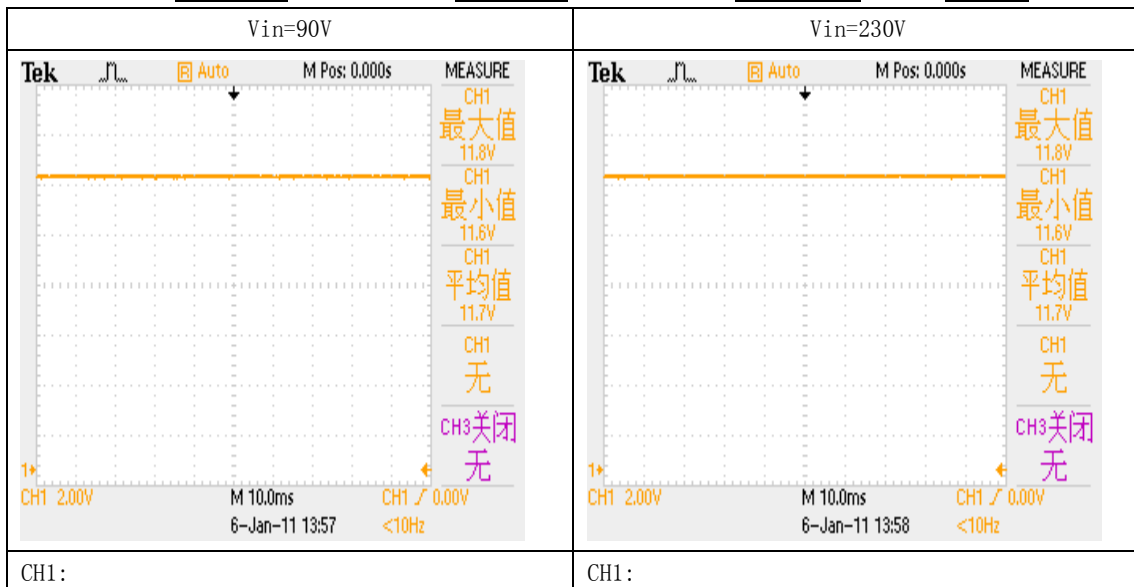
Note: Iout1 > Iout2 > Iout3;

Test Condition: Iout1 满载、Iout3 满载; 改变 Iout3 负载;

Vout3(max)= 12.3V; Vout3(min)= 12.1V ; Vout3(avg)= 12.2V ; Iout3= 7mA



Vout3(max)= 11.8V ; Vout3(min)= 11.6V ; Vout3(avg)= 11.7V ; Iout3= 14mA;



$$\text{Load Regulation}_3 = \frac{V_0 - V_1}{V_0} = \underline{3.3\%};$$

Note: Iout1 > Iout2 > Iout3;

## 2:Line Regulation:

Test Condition: Vin=90V-265V, Iout1=Iout2=Iout3=0A

Vin(V)	90	115	185	220	235	265
Vout1(V)	3.18	3.24	3.30	3.31	3.31	3.31
Vout2(V)	4.53	4.55	4.63	4.62	4.63	4.68
Vout3(V)	13.1	13.08	13.4	12.8	12.9	13.1

Vout1:Line regulation: 3.6% ;LG (MAX): 5%; Result: PASS ;

Vout2:Line regulation: 9.4% ;LG (MAX): 10% ; Result: PASS ;

Vout3:Line regulation: 9.1% ;LG (MAX): 10% ; Result: PASS ;

Test Condition: Vin=90V-265V, Iout1=Iout2=Iout3=1/2 Load

Vin(V)	90	115	185	220	235	265
Vout1(V)	3.13	3.25	3.28	3.28	3.28	3.27
Vout2(V)	5.08	5.08	5.07	5.07	5.07	5.06
Vout3(V)	11.75	11.9	12.0	12.0	12.0	11.9

Vout1:Line regulation: 3.9% ;LG (MAX): 5% ; Result: PASS ;

Vout2:Line regulation: 1.6% ;LG (MAX): 10% ; Result: PASS ;

Vout3:Line regulation: 2.0% ;LG (MAX): 10% ; Result: PASS ;

Test Condition: Vin=90V-265V, Iout1=Iout2=Iout3=Full Load

Vin(V)	90	115	185	220	235	265
Vout1(V)	3.16	3.20	3.26	3.26	3.26	3.26
Vout2(V)	4.84	4.83	4.83	4.82	4.81	4.81
Vout3(V)	12.0	12.0	11.9	11.9	11.9	11.8

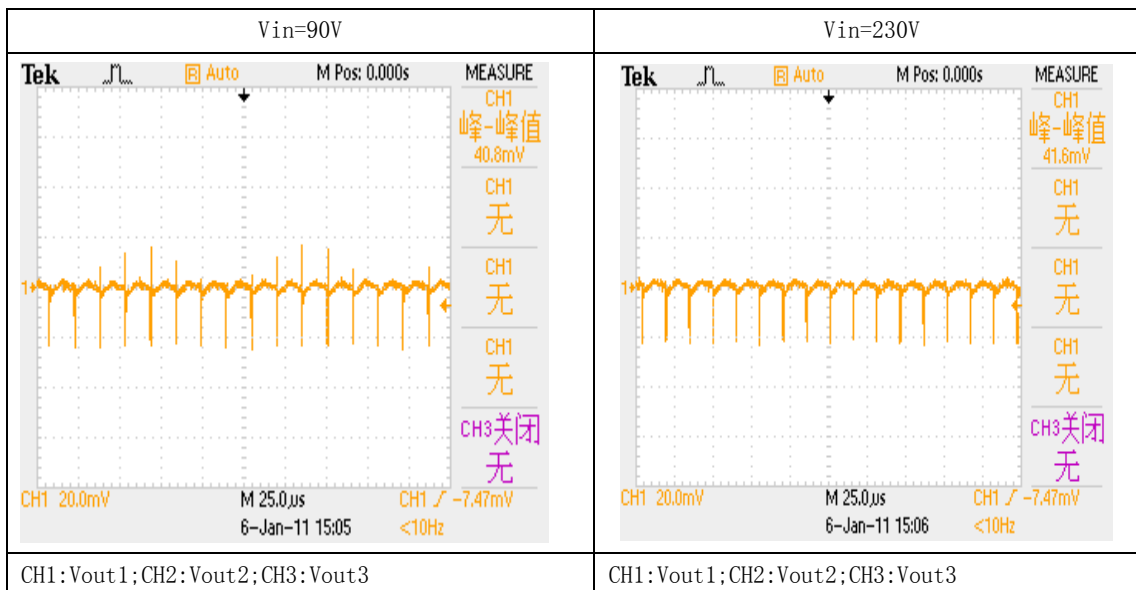
Vout1:Line regulation: 4.2% ;LG (MAX): 5% ; Result: PASS ;

Vout2:Line regulation: 3.8% ;LG (MAX): 10% ; Result: PASS ;

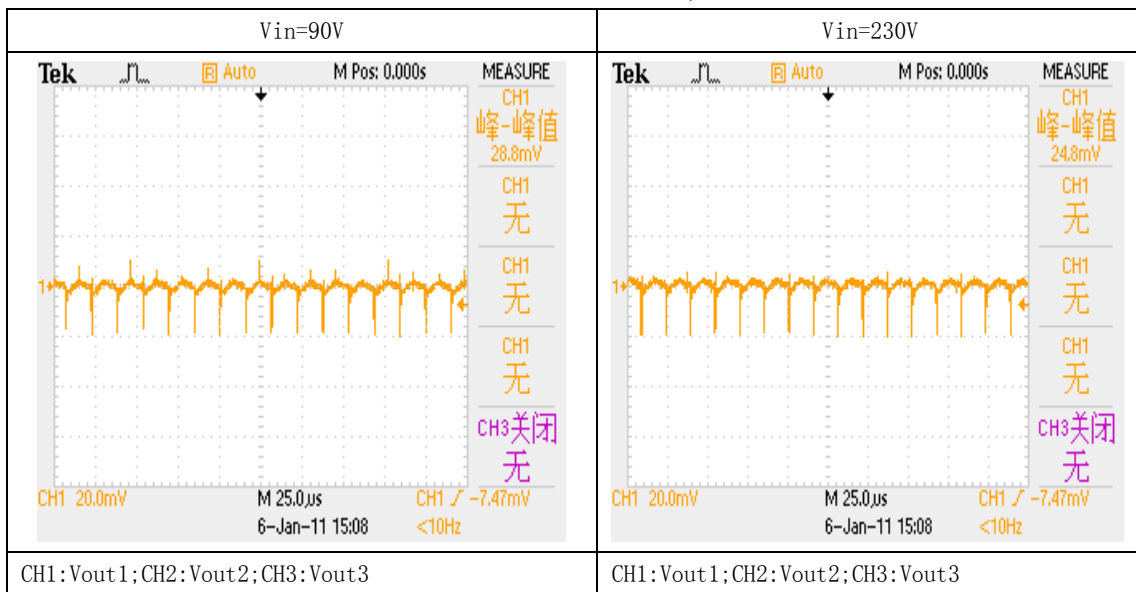
Vout3:Line regulation: 1.6% ;LG (MAX): 10% ; Result: PASS ;

3:Output Ripple Voltage:

Vout1 3.3V Test Condition: Iout1=Iout2=Iout3=Full Load

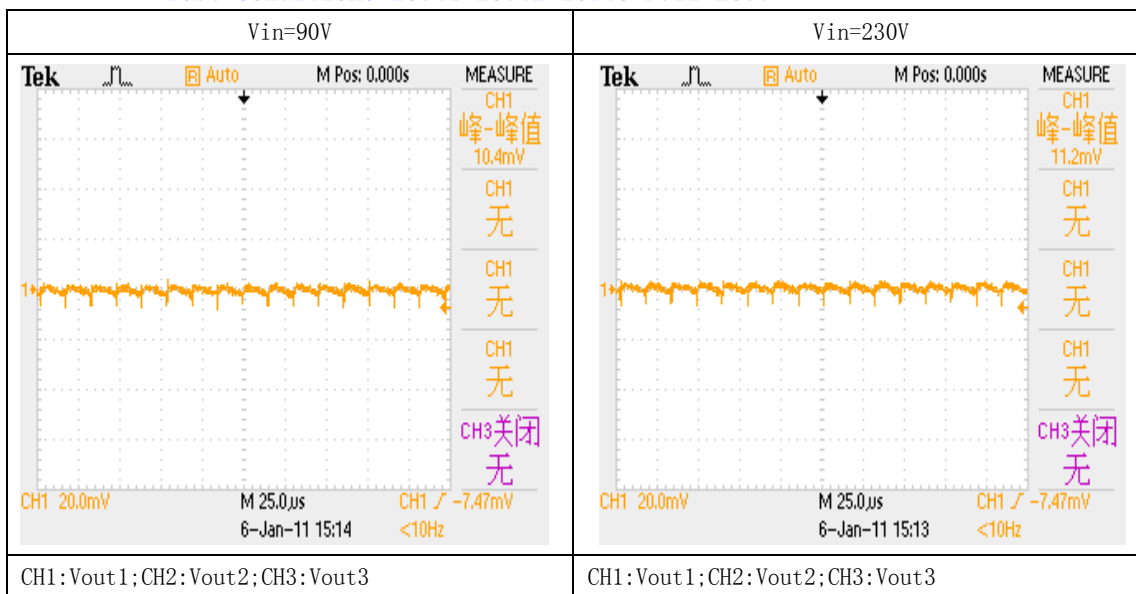


Vout1 3.3V Test Condition: Iout1=Iout2=Iout3=1/2 Load

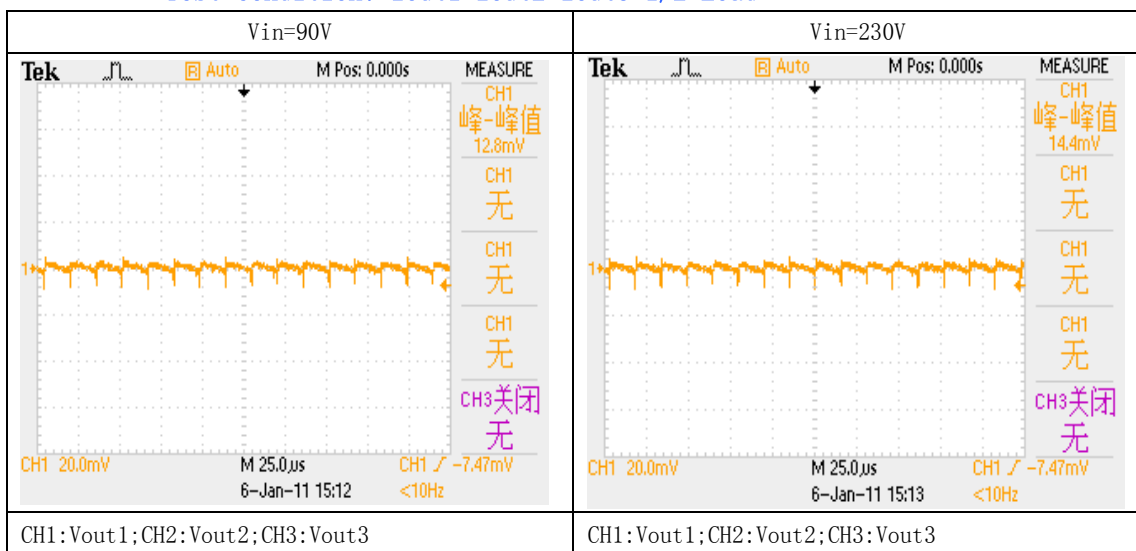


Note: Iout1 > Iout2 > Iout3;

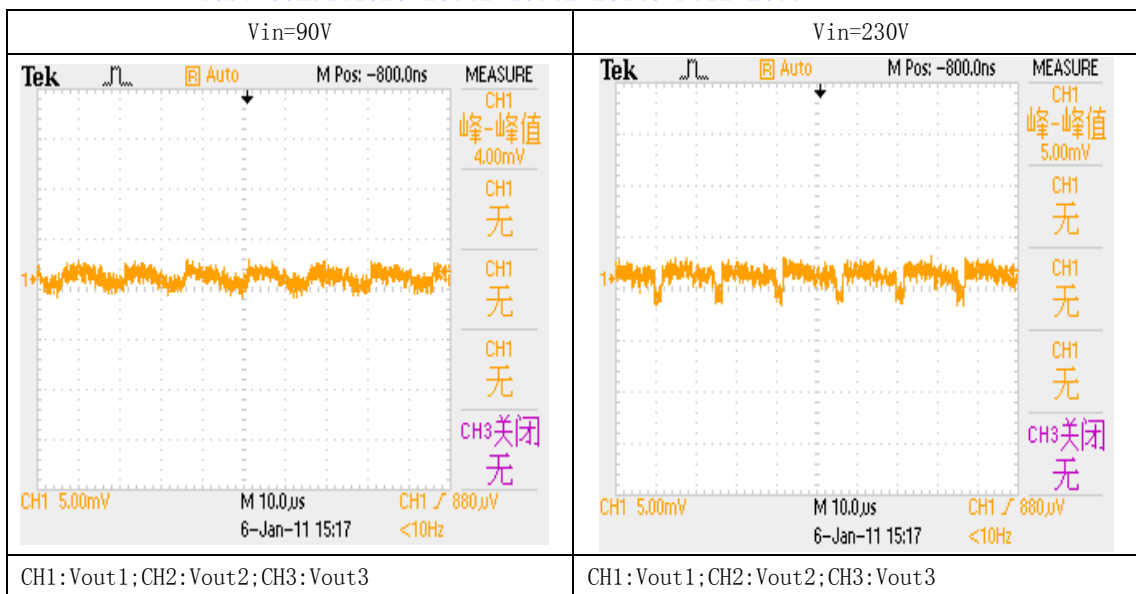
Vout2 5V Test Condition: Iout1=Iout2=Iout3=Full Load



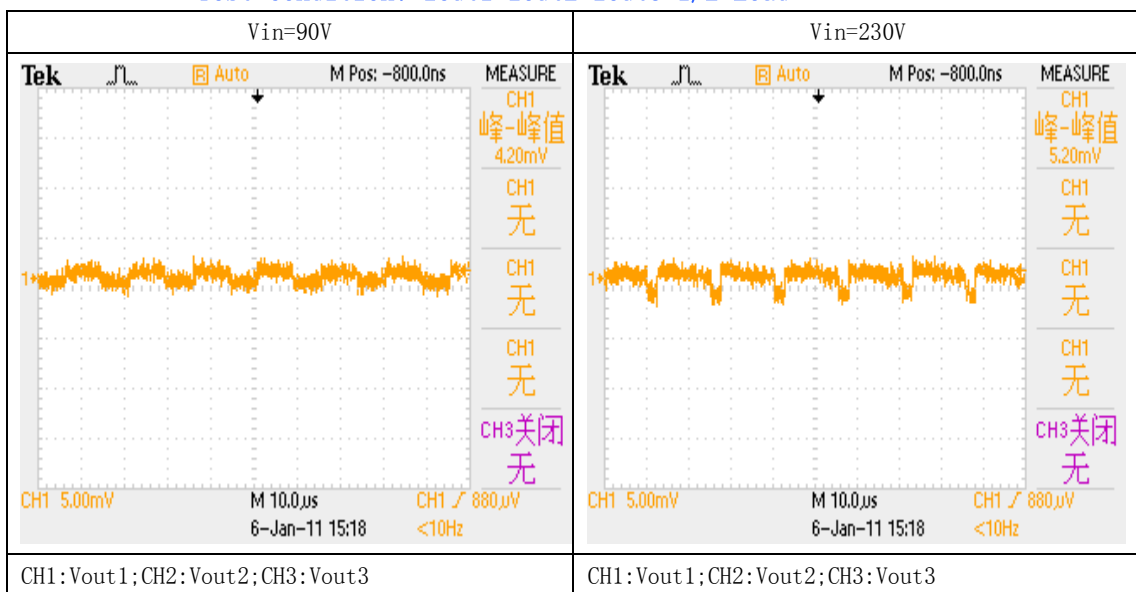
Vout2 5V Test Condition: Iout1=Iout2=Iout3=1/2 Load



Vout3 12V test Condition: Iout1=Iout2=Iout3=Full Load



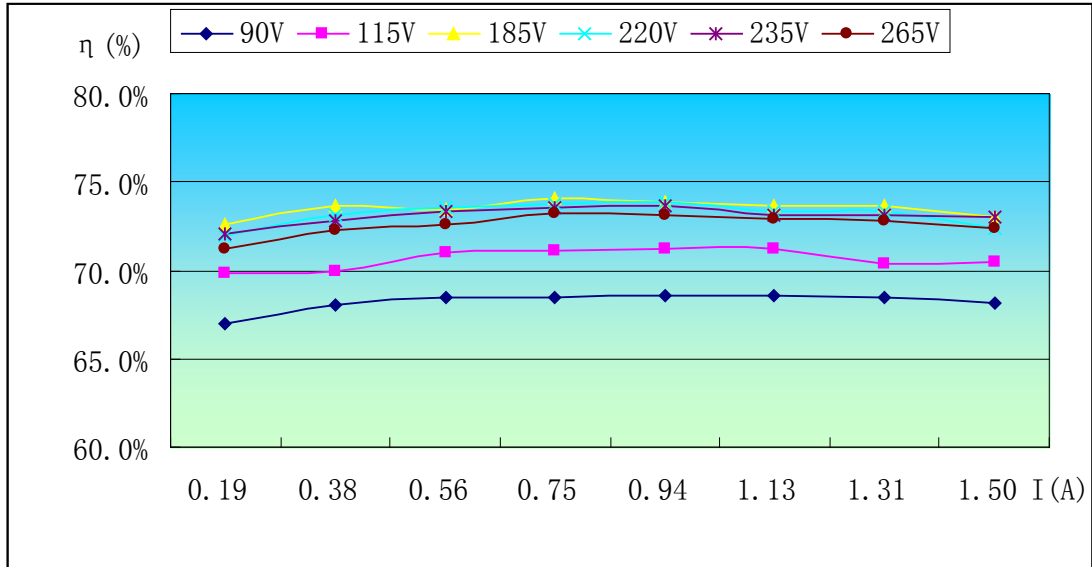
Vout3 12V Test Condition: Iout1=Iout2=Iout3=1/2 Load



## 4:Efficiency:

Test Condition:  $I_{out2}=I_{out2}(\max)$  ;  $I_{out3}=I_{out3}(\max)$ ;  $I_{out1}$  分别取值为  $I_{out1}$  的 1/8、1/4、3/8、1/2、5/8、3/4、7/8、100%负载作为测试点来计算效率。

Note:  $I_{out1} > I_{out2} > I_{out3}$ ;



## 5:Frequency;

Test Condition:  $I_{out1}=1/2I_{out1(max)}$ ;  $I_{out2}$ 、 $I_{out3}$  加满载;

Vin(V)	90	115	185	220	235	265
F(Khz)	65.4	65.5	66.1	66.6	66.3	66.1

F (MAX) : 55KHZ ; F (MIN) : 70KHZ ; Result: PASS ;

Test Condition:  $I_{out1}=I_{out1(max)}$ ;  $I_{out2}$ 、 $I_{out3}$  加满载;

Vin(V)	90	115	185	220	235	265
F(Khz)	67.4	69.8	65.9	65.9	66.0	66.1

F (MAX) : 55KHZ ; F (MIN) : 70KHZ ; Result: PASS ;

Note:  $I_{out1} > I_{out2} > I_{out3}$ ;

## 6:OCP

Test Condition:  $I_{out2}=I_{out3}=0$ ;

Vin(V)	90	115	185	220	265
OCP1(A)	2.86	2.82	2.82	2.83	2.92
Result	pass	pass	pass	pass	pass

Test Condition:  $I_{out1}=I_{out1(max)}$ ;

Vin(V)	90	115	185	220	265
OCP2(A)	0.68	0.72	0.81	0.82	0.85
OCP3(A)	0.021	0.022	0.021	0.024	0.026
Result	PASS	PASS	PASS	PASS	PASS

Notice:  $I_{ocp} = (1.3-2) I_{out(max)}$

Note:  $I_{out1} > I_{out2} > I_{out3}$ ;

## 7:Thermal:

Test Condition:  $I_{out2}$ 、 $I_{out3}$  满载;  $T_a=25^{\circ}C$ , Test Time:30min;

Vin(V)	Iin(A)	IC	Transformer
90V	20% $I_{out1(max)}$	48	32
	40% $I_{out1(max)}$	67	39
	60% $I_{out1(max)}$	72	41
	80% $I_{out1(max)}$	82	43
	100% $I_{out1(max)}$	98	54

Note:  $I_{out1} > I_{out2} > I_{out3}$ ;

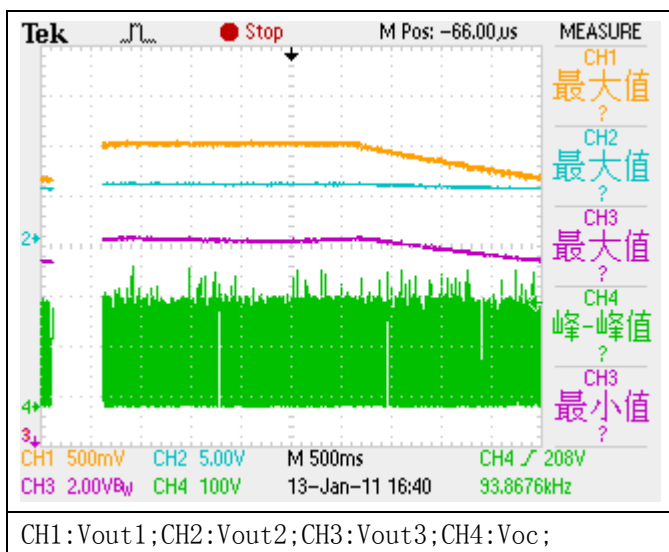
8:OTP:

Test Way:  $V_{in}=85V$ ,  $I_{load}=I_{out(max)}$ , 使用烙铁加热 IC 表面温度, 同时并检测 IC 表面温度的变化, 当输出电压掉出规定范围时的 IC 的表面温度即为 IC 的 OTP 点, 此时移开热源或者减小负载 (也可升高输入电压) 检测输出电压是否可以恢复正常值, 如果可恢复则证明 OTP 功能正常, 如果输出电压不能恢复到正常值, 则证明 OTP 功能失效。

Result: PASS;

OTP: 138°C; (指 OTP 时 IC 表面的温度)

Test Waveform:



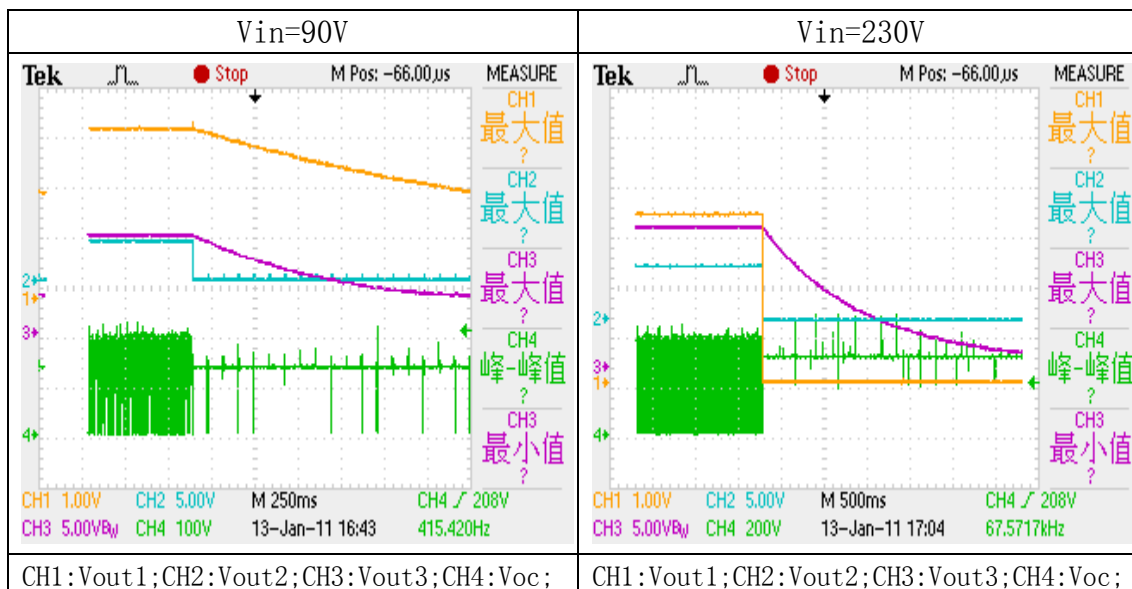
Note:  $I_{out1} > I_{out2} > I_{out3}$ ;

9:OSP

Test Way: 短路输出端开机或者先开机后短路, 检测 IC 在这种情况下是否具有自我保护功能, 当负载恢复正常后 IC 可以恢复正常工作, 输出正常; 同时检测此时的输入功率的大小, 此时功率越小越好。

Vin(V)	90V	115V	230V	265V
Pin(W)	11.4	11.6	11.3	11.3
Pshort(W)	0.61	0.83	1.1	1.2
Result	PASS	PASS	PASS	PASS

Test Waveform:



Note:  $I_{out1} > I_{out2} > I_{out3}$ ;

10:Dioe drop Voltage: (Iload=Iout(max));

Vin(V)	90V	115V	230V	265V
Vdrop1 (V)	11.2	13.2	20.8	25.6
Vdrop2 (V)	13.6	18	27.2	31.2
Vdrop3 (V)	32.0	38.4	60.8	68.2
Voc (V)	244	296	460	481
Result	PASS	PASS	PASS	PASS

Test waveform:

