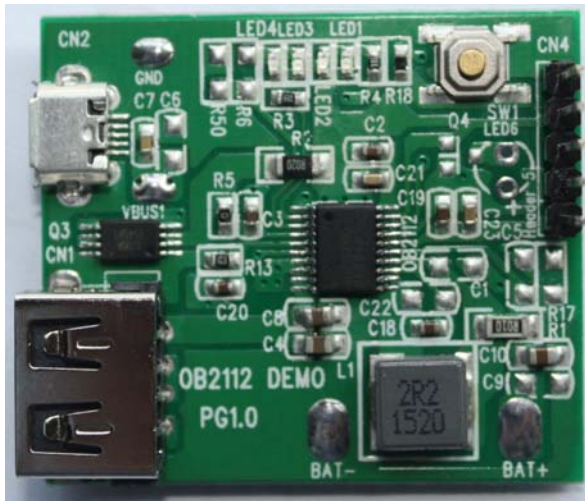


Subject
OB2112 Demo Board Manual

Board Model: AD5.0V2A2112.00
 Doc. No.: OB_DOC_DBM_211200



Key features:

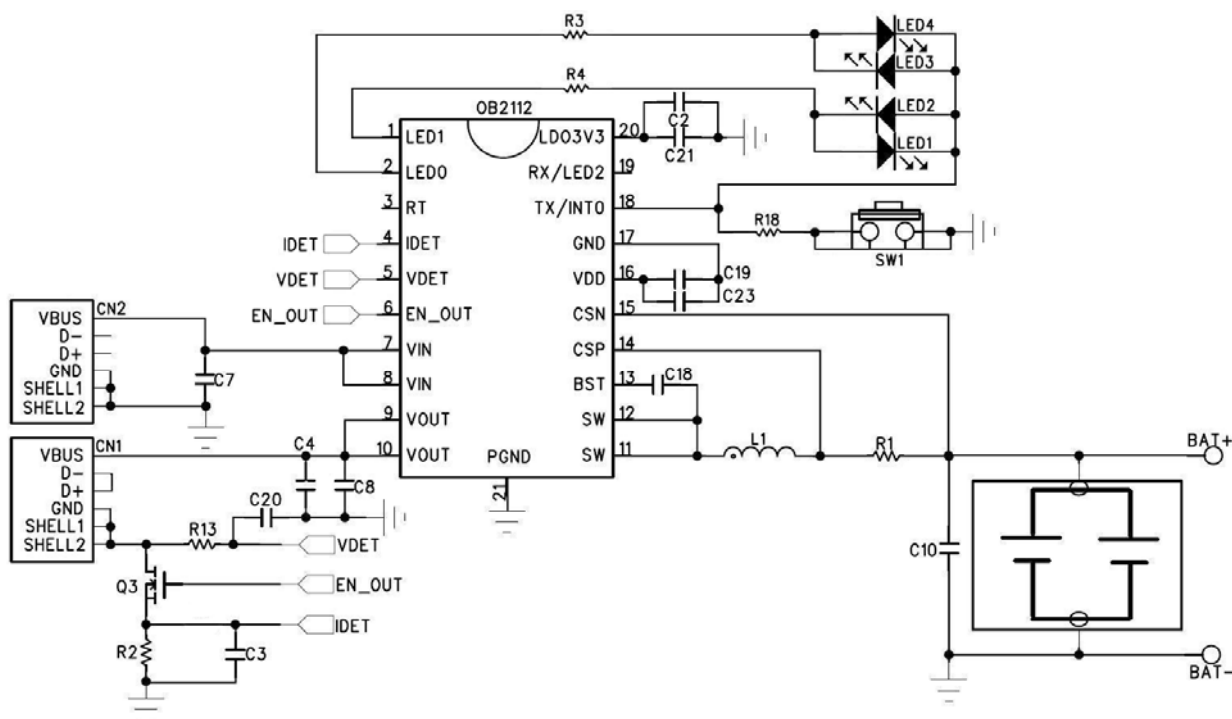
- Lowest possible component count.
- Multiple mode operation with charge, discharge, path-through and sleep mode.
- Very low sleep mode power consumption.
- Efficiency measured >90% at buck charge and boost discharge mode.
- Comprehensive protection including Battery OVP/UVP/OTP/OC, Output OVP/SCP, Input OVP etc.

Revision History

Revise Date	Version	Reason/Issue
2016-05-04	00	First issue

1. Board Information

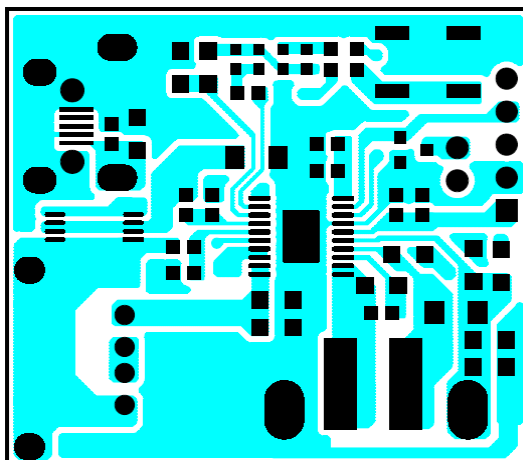
1.1. Board schematic



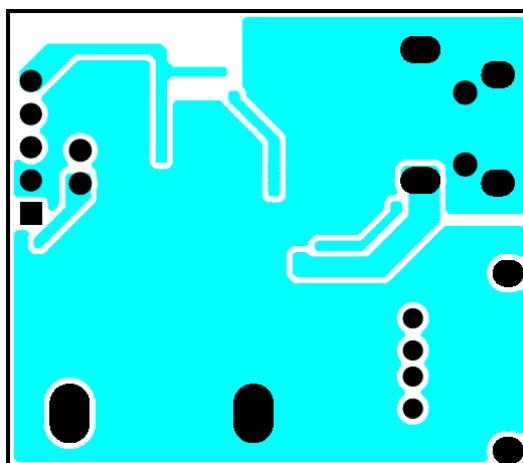
1.2. Component list

No.	Position	Description	Quantity
1	R1	SMD RES 0R01 /1% /1206	1
2	R2	SMD RES 0R02 /1% /1206	1
3	R3,R4	SMD RES 330R /5% /0603	2
4	R5	SMD RES 0R /5% /0603	1
5	R13	SMD RES 1K /5% /0603	1
6	R18	SMD RES 1K5 /5% /0603	1
7	C4,C8,C10	SMD CAP 22uF /25V	3
8	C2,C3,C18,C19,C20	SMD CAP 0.1uF /25V	5
9	C7,C21,C23	SMD CAP 2.2uF /25V	3
10	Q3	SMD N-MOS 8205 / TSSOP-8	1
11	L1	SMD inductor 2.2uH	1
12	LED1-LED4	SMD 蓝光 LED /0603	4
13	SW1	SMD 按键开关	1
14	U1	OB2112 / TSSOP-20	1
15	CN1	SMD USB_HOST	1
16	CN2	SMD micro_USB	1
17	PCB	OB2112 DEMO PG1.0	1
	Total		29

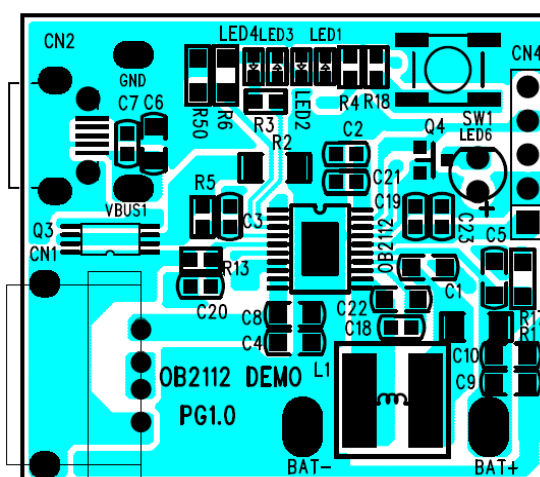
1.3.PCB Gerber File



Top

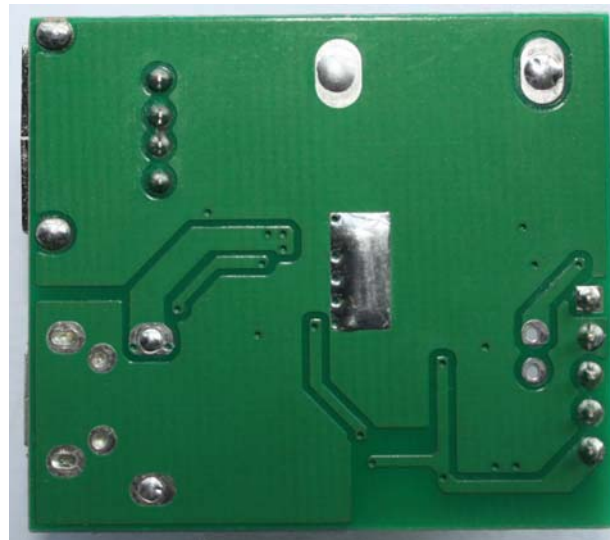
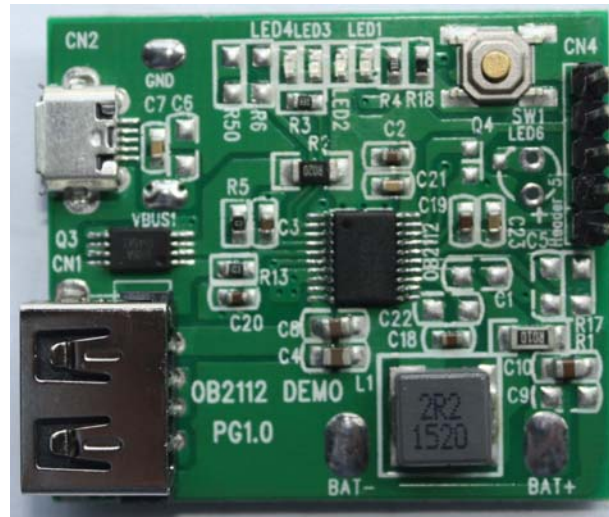


Bottom



Silkscreen Top

1.4. Snapshot



2. Converter Specification

2.1. Input Characteristics

- Buck input voltage range 4.5-5. 5Vdc
- Boost input voltage range 3.0-4.2Vdc (V_{BAT})

2.2. Output Characteristics

- Buck output voltage & current 3.0-4.2V/2A
- Boost output voltage & current 5.0V/2A
- Operating frequency 300KHz

2.3. Performance Function

- Standby Power < 50uA@4.2V battery voltage
- Efficiency >90%
- Ripple & Noise <100mV

2.4. Protection Function

- Input Over Voltage Protection Shut down with auto-restart
- Output OVP Shut down with auto-restart
- Battery OVP / OTP/ OCP Shut down with auto-restart
- Output SCP / Battery UVP Shut down with Latch

3. Performance Evaluation

3.1. Standby Power

V_{BAT}	I_{IN} (uA)	Spec	Remark
3.0Vdc	11.4	<50uA	Pass
3.3Vdc	12.4		Pass
3.6Vdc	13.0		Pass
3.9Vdc	13.6		Pass
4.2Vdc	28.7		Pass

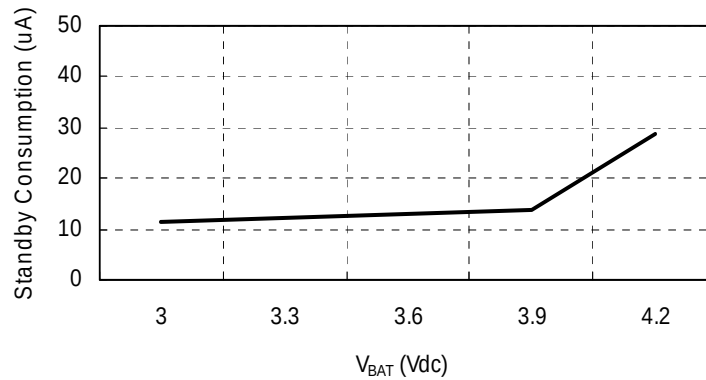


Figure 1. Standby input current

3.2. Efficiency

	V_{BAT} (Vdc)	CC@ Vin=5V (%)	Spec	Remark
Buck CC	3.0	90.4	>90%	Pass
	3.3	91.1		Pass
	3.6	91.6		Pass
	3.9	92.3		Pass
	4.2	92.7		Pass

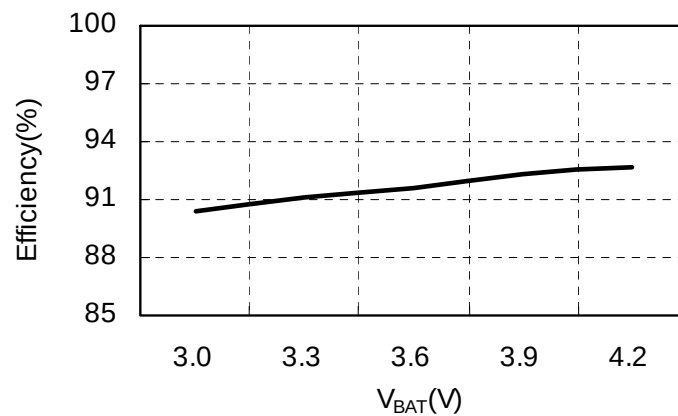


Figure 2. Efficiency @Buck CC mode

	Load (A)	CV@ Vin=5V (%)	Spec	Remark
Buck CV	0.5	95.8	>90%	Pass
	1.0	95.4		Pass
	1.5	94.7		Pass
	2.0	93.5		Pass

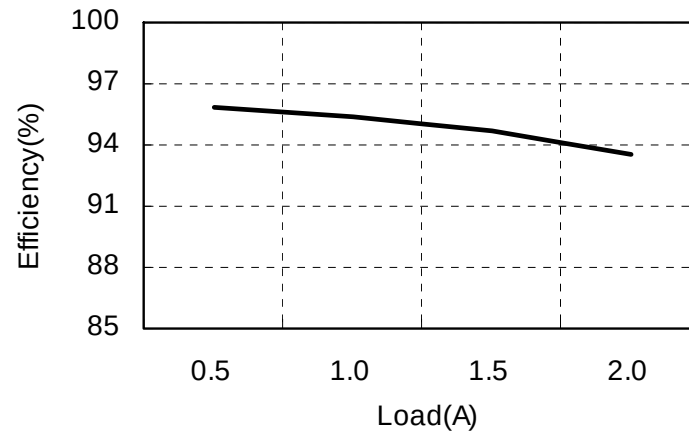


Figure 3. Efficiency @Buck CV mode

	Load (A)	CV@ V _{BAT} =4.2V (%)	Spec	Remark
Boost CV	0.5	95.4	>90%	Pass
	1.0	94.8		Pass
	1.5	93.8		Pass
	2.0	92.1		Pass

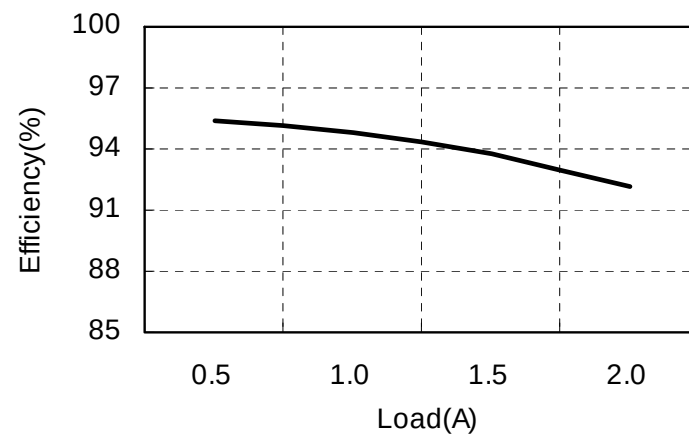


Figure 4. Efficiency @Boost CV mode

3.3. Output Voltage & Current

	Buck CV@ Vin=5V										
I _{out} (A)	0	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2.0
V _{BAT} (V)	4.179	4.169	4.167	4.168	4.168	4.169	4.171	4.174	4.181	4.188	4.198

	Buck CC@ Vin=5V								
V _{BAT} (V)	4.2	4.0	3.8	3.6	3.4	3.2	3.0	2.8	
I _{out} (A)	2.090	2.100	2.108	2.114	2.118	2.108	2.108	2.094	

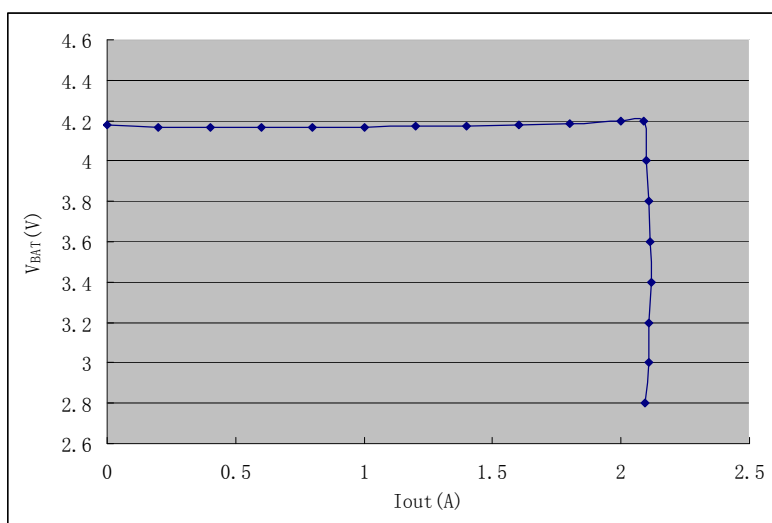


Figure 5. I-V curve@ Buck mode

	Boost CV@ V _{BAT} =4.2V										
Load (A)	0A	0.2A	0.4A	0.6A	0.8A	1A	1.2A	1.4A	1.6A	1.8A	2.0A
V _{out} (V)	5.029	4.980	4.965	4.953	4.945	4.943	4.944	4.950	4.952	4.970	4.972

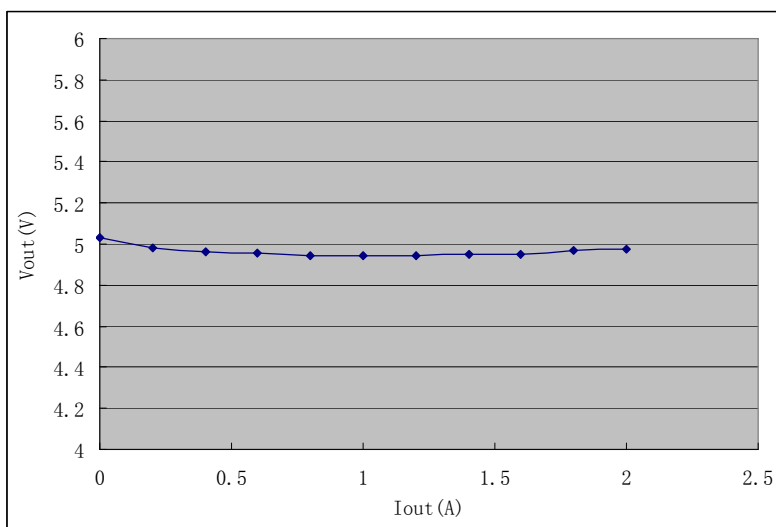


Figure 6. Load regulation @Boost CV mode

3.4. Boost BAT UVP (Figure 7)

UVP	Test Result (V)	Spec	Remark
V _{BAT}	2.84	2.8V	Pass

3.5. Boost Output Voltage OVP (Figure 8)

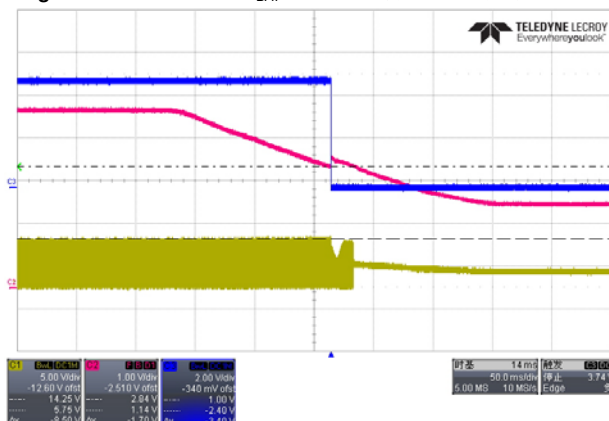
OVP	Test Result (V)	Spec	Remark
V _{out}	5.6	5.5V	Pass

3.6. Ripple & Noise (Figure 9&10 11&12)

V _{BAT} (V)	No load (mV)	Full load (mV)	Spec	Remark
3.0	18.0	51.4	<100mV	Pass
3.3	18.2	48.3		Pass
3.6	18.3	46.7		Pass
3.9	15.0	42.4		Pass
4.2	15.2	39.6		Pass

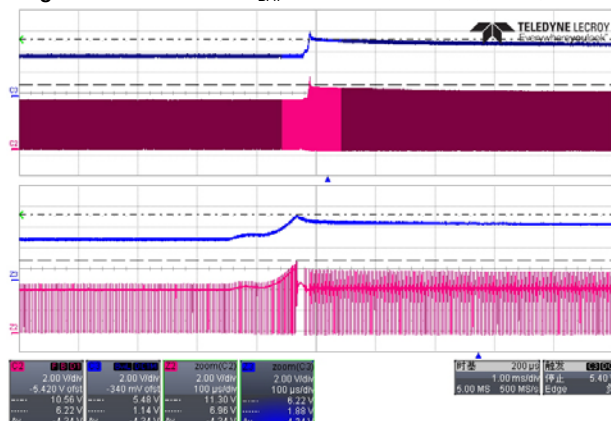
3.7. Waveforms

Figure 7: Boost mode, V_{BAT}=4.2V 开始降低, 直到触发 UVP



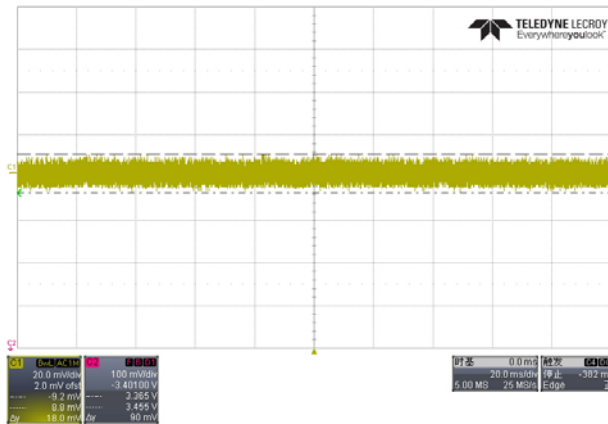
CH1: SW CH2: V_{BAT} CH3: V_{OUT}
 V_{out}=5V, 设定负载 2A, V_{BAT}=2.84V 时系统停止工作

Figure 8: Boost mode, V_{BAT}=4.2V, V_{out} 卸载过程中触发 OVP



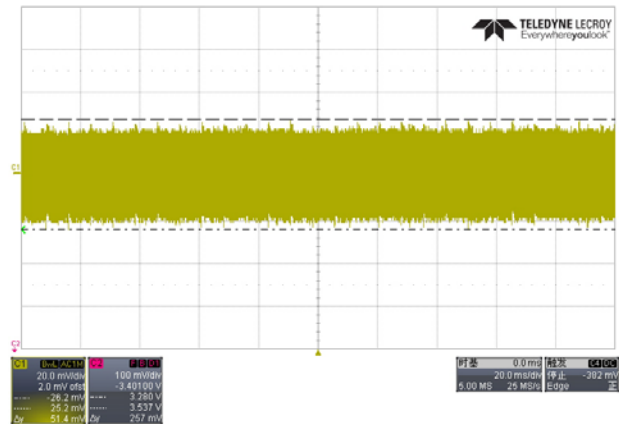
CH2: SW CH3: V_{out}
 负载切换过程中 V_{out} 冲高, 触发 OVP=5.5V

Figure 9: Boost mode, $V_{BAT}=3.0V$, no-load



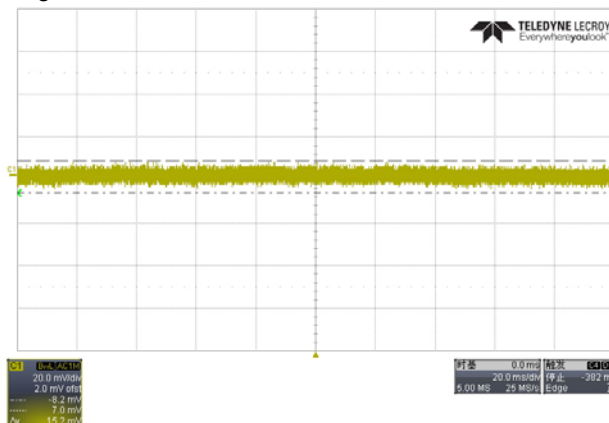
CH1: V_{ripple}
 $V_{out}=5V$, 设定空载, $V_{ripple}=18.0mV$

Figure 10: Boost mode, $V_{BAT}=3.0V$, full load



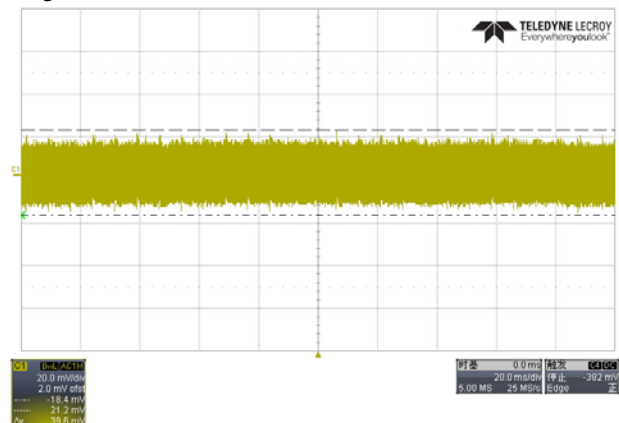
CH1: V_{ripple}
 $V_{out}=5V$, 设定满载, $V_{ripple}=51.4mV$

Figure 11: Boost mode, $V_{BAT}=4.2V$, no-load



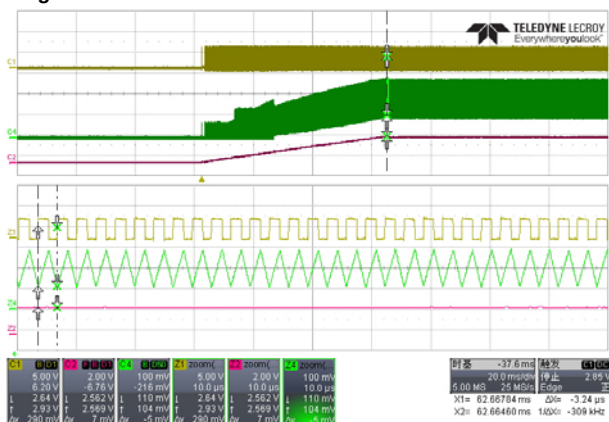
CH1: V_{ripple}
 $V_{out}=5V$, 设定空载, $V_{ripple}=15.2mV$

Figure 12: Boost mode, $V_{BAT}=4.2V$, full load



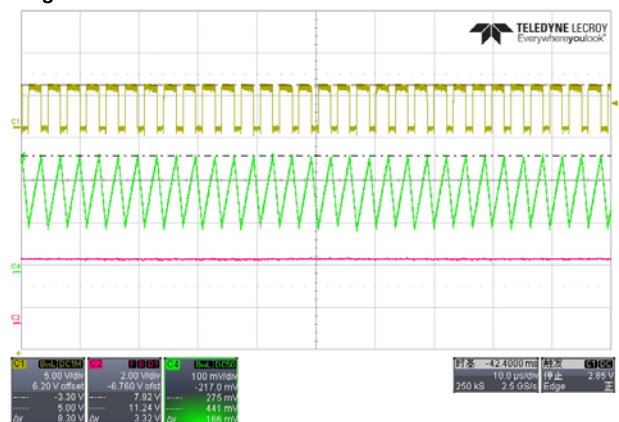
CH1: V_{ripple}
 $V_{out}=5V$, 设定满载, $V_{ripple}=39.6mV$

Figure 13: Buck CC mode, $V_{in}=5V$, start at full load



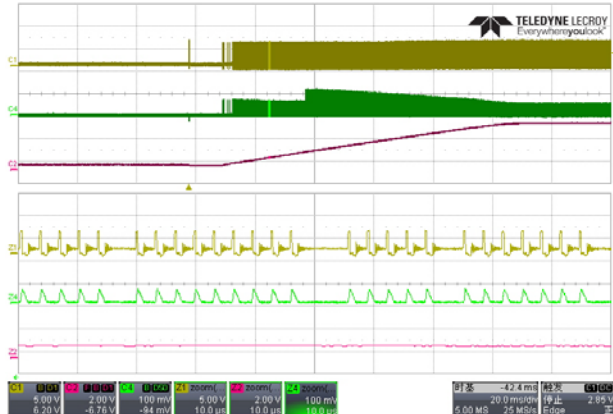
CH1: SW CH2: V_{BAT} CH4: I_L
 设定 $V_{BAT}=4.2V$, 满载启动波形

Figure 14: Buck CC mode, $V_{in}=5V$, normal at full load



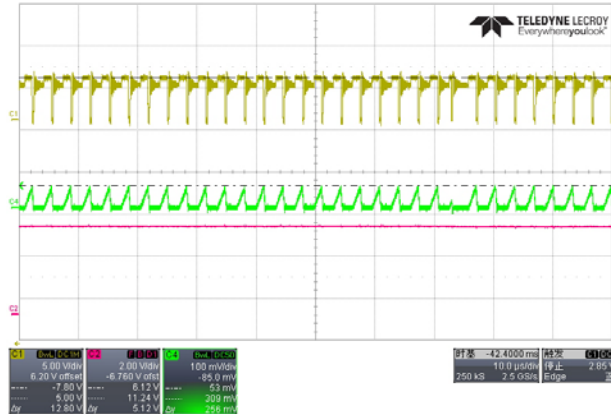
CH1: SW CH2: V_{BAT} CH4: I_L
 设定 $V_{BAT}=4.2V$, 满载正常工作波形

Figure 15: Buck CV mode, $V_{in}=5V$, start at light load



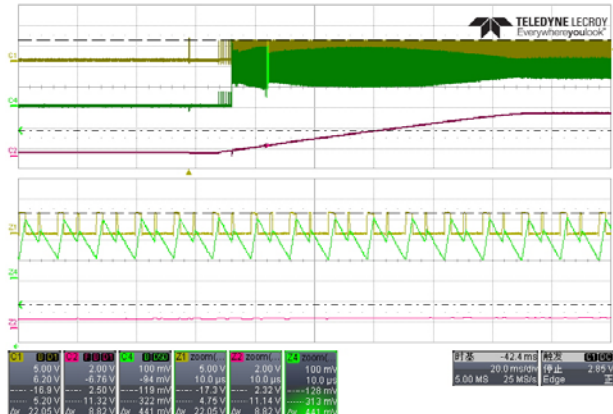
CH1:SW CH2: V_{BAT} CH4: I_L
 设定 $I_{OUT}=0.1A$, 轻载启动波形

Figure 16: Buck CV mode, $V_{in}=5V$, normal at light load



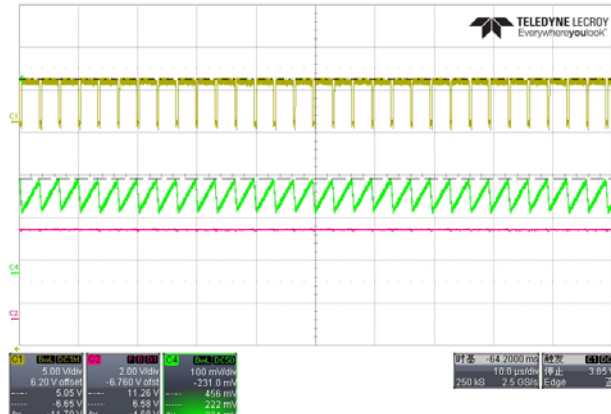
CH1:SW CH2: V_{BAT} CH4: I_L
 设定 $I_{OUT}=0.1A$, 轻载正常工作波形

Figure 17: Buck CV mode, $V_{in}=5V$, start at full load



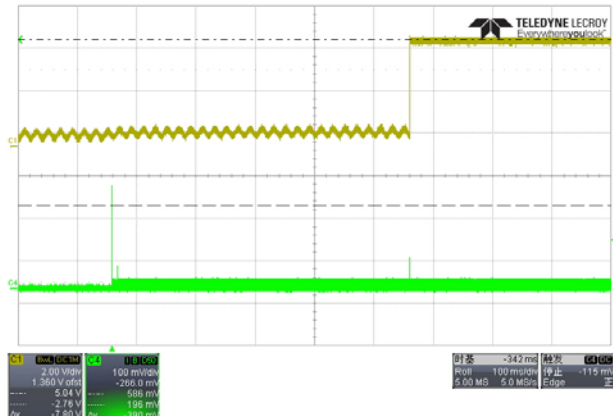
CH1:SW CH2: V_{BAT} CH4: I_L
 设定 $I_{OUT}=2A$, 满载启动波形

Figure 18: Buck CV mode, $V_{in}=5V$, normal at full load



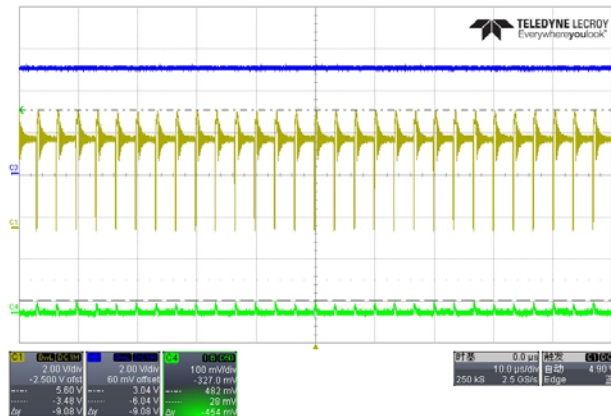
CH1:SW CH2: V_{BAT} CH4: I_L
 设定 $I_{OUT}=2A$, 满载正常工作波形

Figure 19: Boost mode, $V_{BAT}=4.2V$, start at no-load



CH1: V_{out} CH2: I_L
 $V_{out}=5V$, 设定负载 0A, 空载启动波形

Figure 20: Boost mode, $V_{BAT}=4.2V$, normal at no-load



CH1: SW CH2: I_L CH3: V_{out}
 $V_{out}=5V$, 设定负载 0A, 空载正常工作波形

Figure 21: Boost mode, $V_{BAT}=4.2V$, start at full load

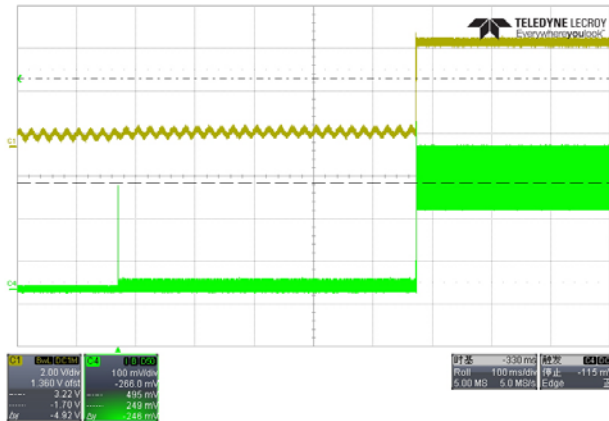
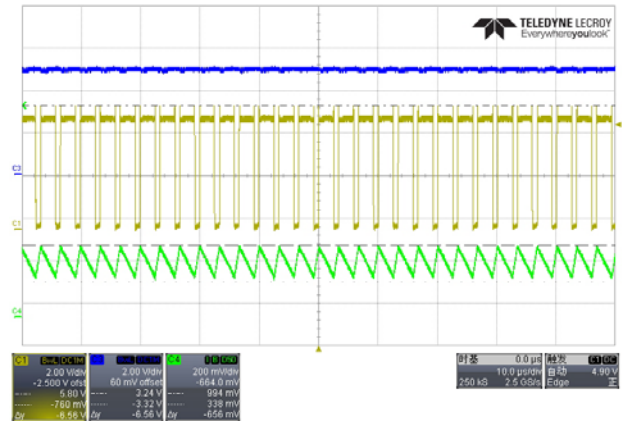


Figure 22: Boost mode, $V_{BAT}=4.2V$, normal at full load



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