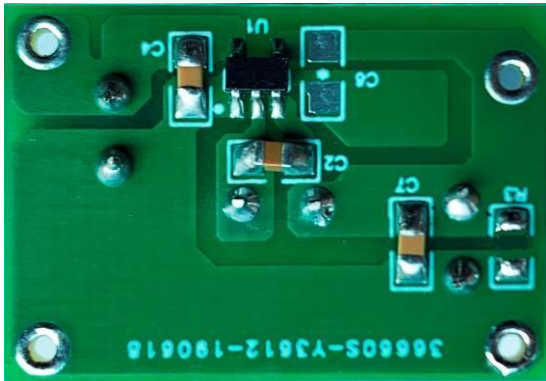


Subject
OB2105 Demo Board Manual

Board Model: WIFI DCDC 5V0.9A2105MEP.02 1925

Doc. No.: OB_DOC_DBM_B_210502


Key features:

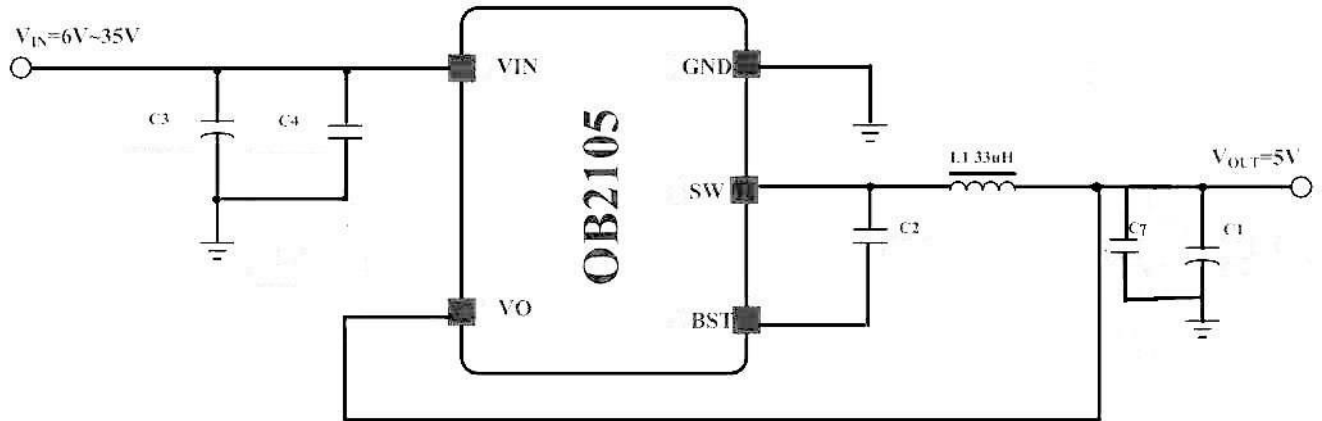
- Wide 6V to 35V Operating Input Range
- Synchronous Operating without External Schottky Diode
- Simplified External Device Requirement
- Up to 90% efficiency at V_{OUT} 5.0V 0.9A, V_{IN} 12V.
- Fixed 160KHz Frequency
- Multi-Stage Short Circuit Protection and Hiccup Mode
- V_{IN}/V_{OUT} Over Voltage Protection and Over Temperature Protection
- Good EMI Performance

Revision History

Revise Date	Version	Reason/Issue
2019-06-28	00	First issue
2019-08-22	01	Cost down & Update BOM List
2019-12-09	02	Cost down & add dynamic

1. Board Information

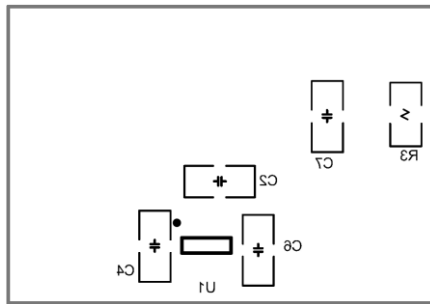
1.1 Board schematic



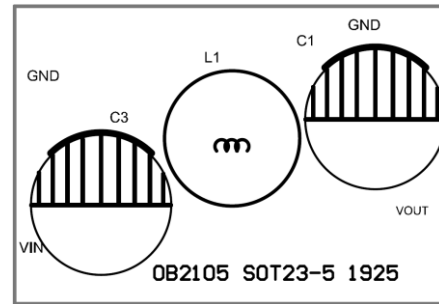
1.2 Bill of material

No.	Position	Description	Quantity
1	C1	E.C. 220uF/25V,10mm*6mm,Jamicon,RS105°C	1
2	C2	SMD CAP 100nF/50V 0805	1
3	C3	E.C., 100uF/50V,12mm*8mm,Aishi,1510JPET,RS105°C	1
4	C4	SMD CAP 3.3nF/50V 0805	1
5	C7	SMD CAP 100nF/10V 0805	1
6	L1	Inductor 33uH, DR8*10, Φ0.5mm*32TS	1
7	U1	OB2105,SOT23-5	1
8	PCB	OB2105 SOT23-5 1925	1
9	C6	NC	
	Total		7

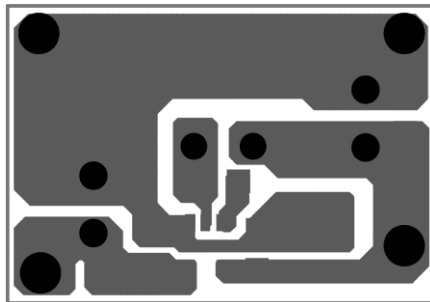
1.3 PCB Gerber File



Top Sil

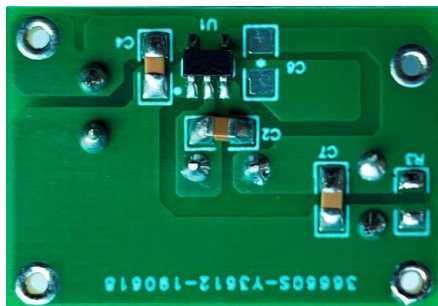


TOP



Bot

1.3 Snapshot



2. Converter Specification

2.1 Input Characteristics

input voltage range	6-35Vdc
---------------------	---------

2.2 Output Characteristics

output voltage & current	5V0.9A
--------------------------	--------

Operating frequency	160KHz
---------------------	--------

2.3 Performance Function

Efficiency	UP to 90% /Vin 12V
------------	--------------------

Ripple & Noise	<150mV
----------------	--------

2.4 Protection Function

Vin UVLO	Shut down with auto-restart
----------	-----------------------------

Vin OVP	Shut down with auto-restart
---------	-----------------------------

Output OVP	Shut down with auto-restart
------------	-----------------------------

OTP	Shut down with auto-restart
-----	-----------------------------

OCP	Shut down with auto-restart
-----	-----------------------------

Output SCP	Shut down with auto-restart
------------	-----------------------------

3. Performance Evaluation

3.1 VIN UVLO

		Test result	Spec Typ.	Remark
UVLO	OFF	5.86V	5.8V	pass
	ON	5.44V	5.4V	pass

3.2 VIN OVP

		Test result	Spec Typ.	Remark
OVP	OFF	36.71V	36.3V	pass
	ON	37.13V	37V	pass

3.3 Efficiency

Burn in 2 min., PCB End's Efficiency.

3.3.1 Vo=5V0.9A

VIN (V)	25%	50%	75%	100%	AVG
8	94.55	94.63	93.43	91.70	93.57
12	92.16	93.40	92.70	91.04	92.32
24	87.75	90.00	90.28	89.05	89.27
32	85.76	87.21	88.40	87.27	87.16

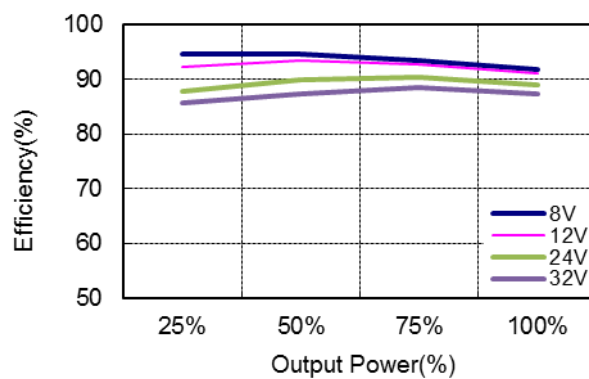


Figure 1. Efficiency @Buck CV mode 5V/0.9A

3.4 Output Voltage vs. Input Voltage

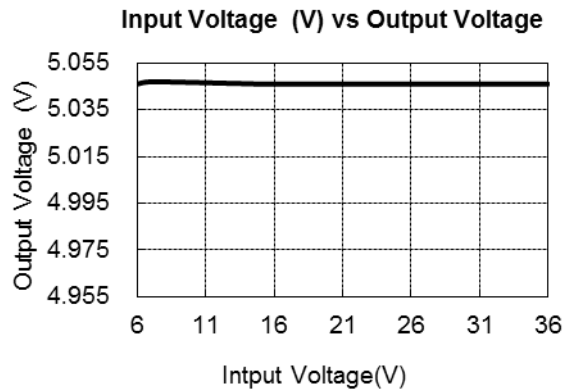


Figure 2. Input Voltage vs Output Voltage

3.5 Output Voltage vs. Output Current

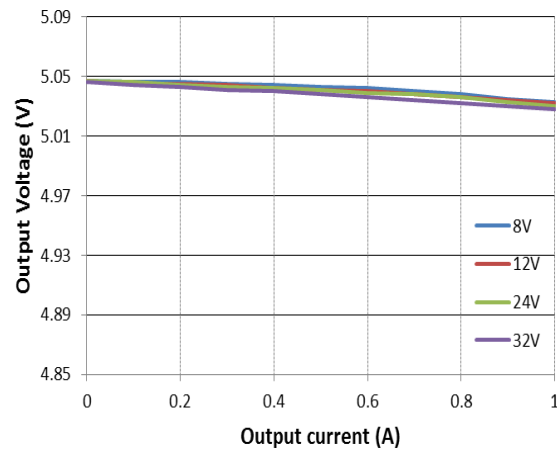


Figure 3. Output Voltage vs Output Current

3.6 Ripple & noise

20MHZ Bandwidth , PCB END

VIN (V)	LOAD=5V/0A	LOAD=5V/0.9A
8	32	38
12	37	53
24	55	85
32	61	100

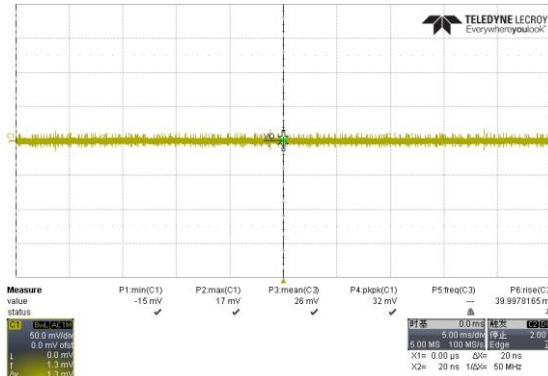
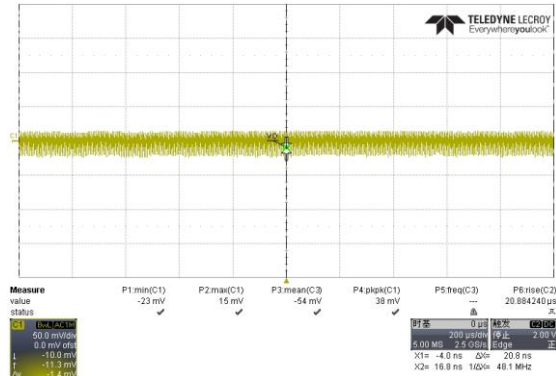
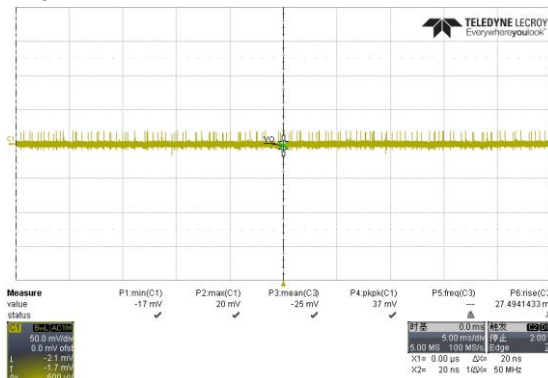
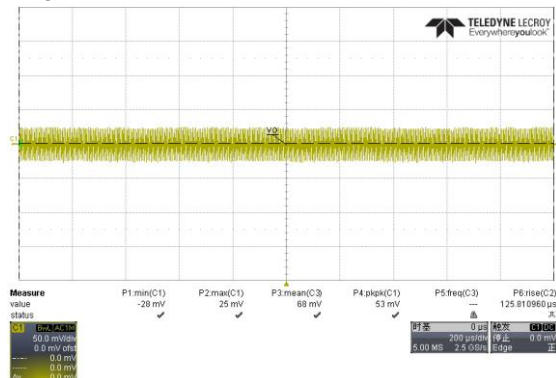
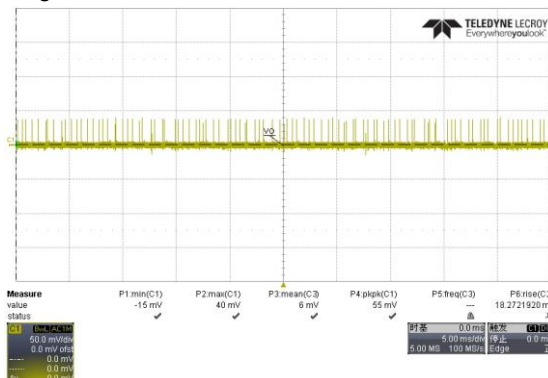
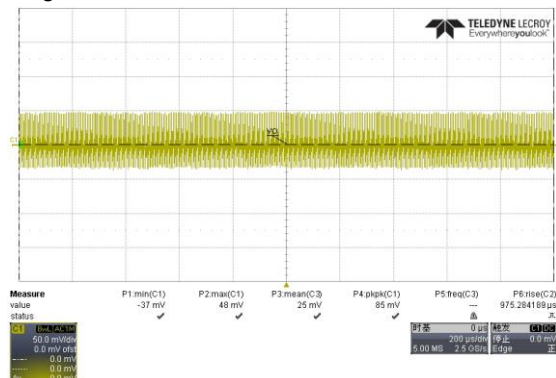
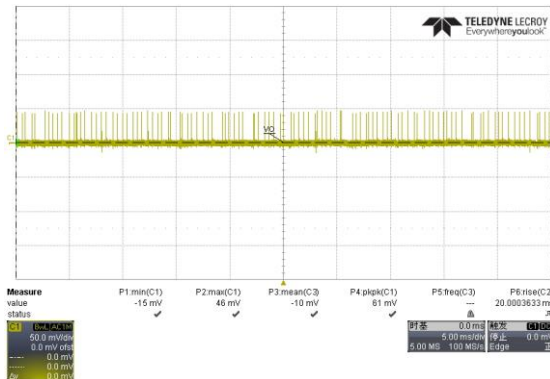
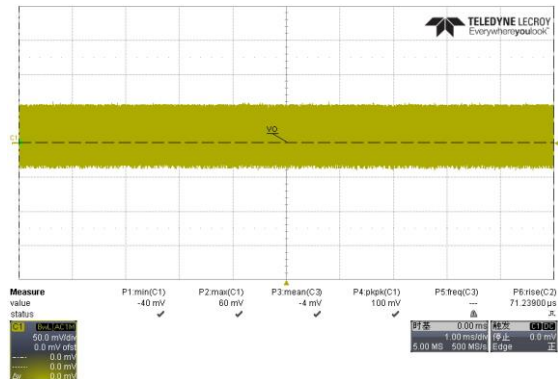
Figure 4: $V_{IN}=8V$, no-load

 CH1: V_{ripple}
Figure 5: $V_{IN}=8V$, full load

 CH1: V_{ripple}
Figure 6: $V_{IN}=12V$, no-load

 CH1: V_{ripple}
Figure 7: $V_{IN}=12V$, full load

 CH1: V_{ripple}
Figure 8: $V_{IN}=24V$, no-load

 CH1: V_{ripple}
Figure 9: $V_{IN}=24V$, full load

 CH1: V_{ripple}

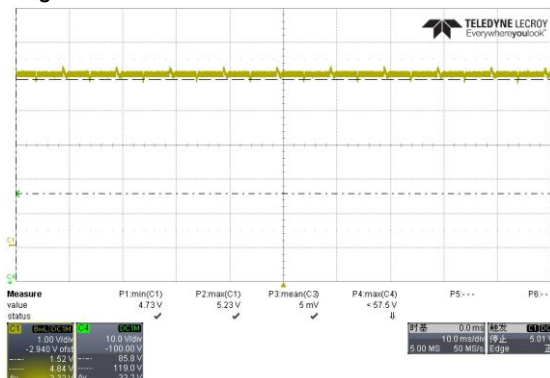
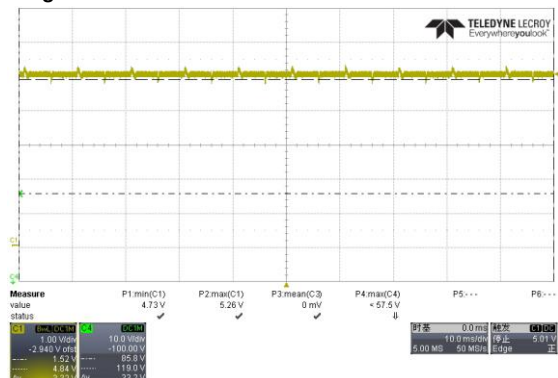
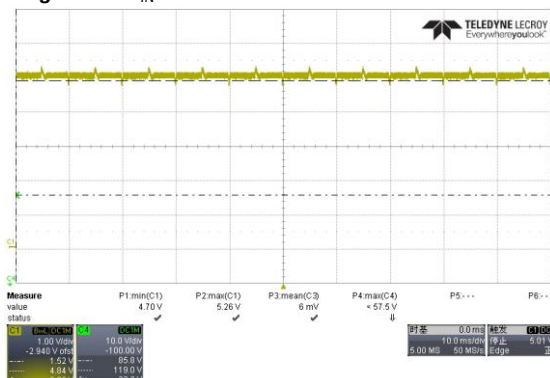
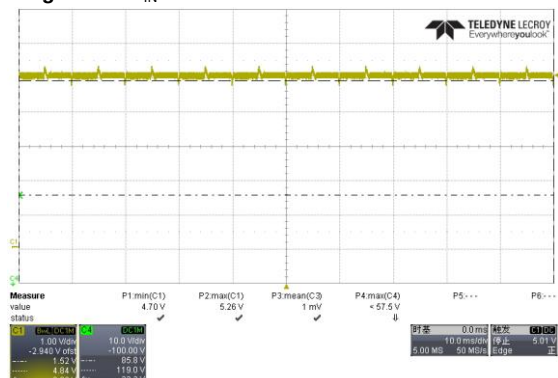
Figure 10: $V_{IN}=32V$, no-load

 CH1: V_{ripple}
Figure 11: $V_{IN}=32V$, full load

 CH1: V_{ripple}

3.7 Dynamic Test

A dynamic loading with low set at 10% load lasting for 5ms and high set at 90% load lasting for 5mS is added to output. The ramp is set at 0.25A/us at transient. Measurement was taken at Board end(Same as R&N measurement)

Output voltage under dynamic test

DC Input	Output (V)	Remark
8V	↓ 4.73-5.23 ↑	
12V	↓ 4.73-5.26 ↑	
24V	↓ 4.70-5.26 ↑	
32V	↓ 4.70-5.26 ↑	

Figure 12: $V_{IN}=8V$

 CH1: V_O
Figure 13: $V_{IN}=12V$

 CH1: V_O
Figure 14: $V_{IN}=24V$

 CH1: V_O
Figure 15: $V_{IN}=32V$

 CH1: V_O

3.8 Waveforms

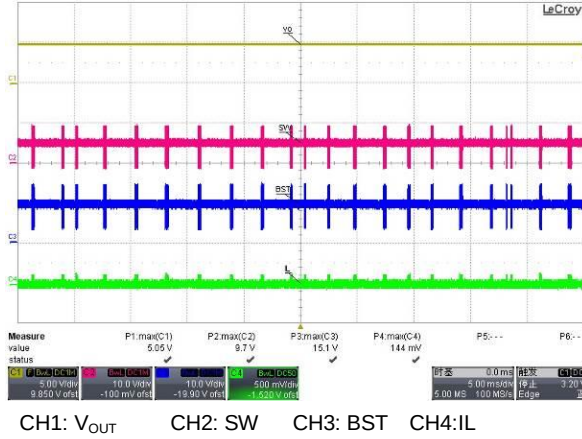
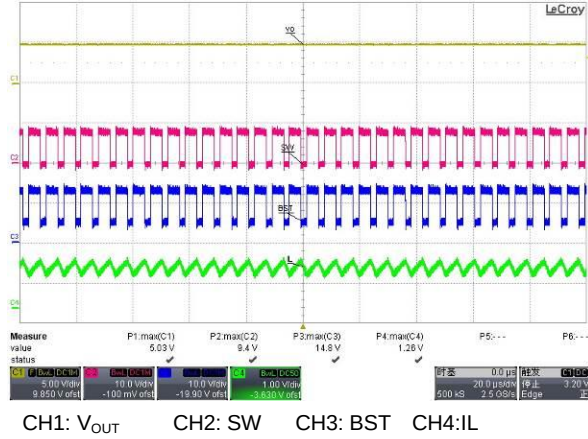
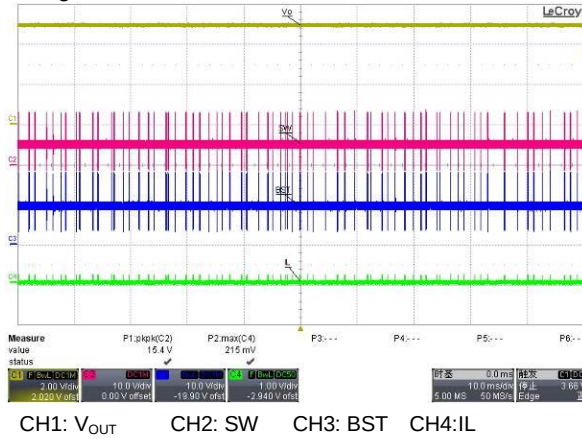
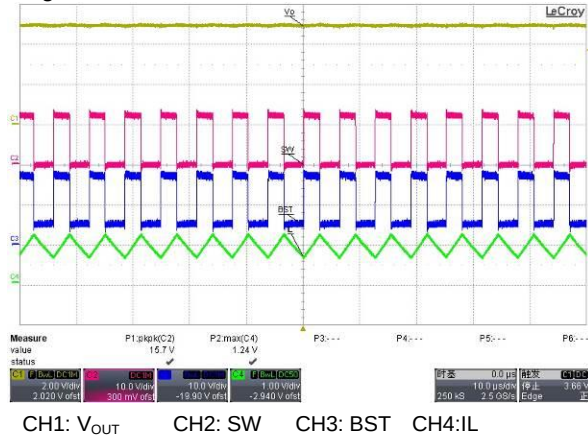
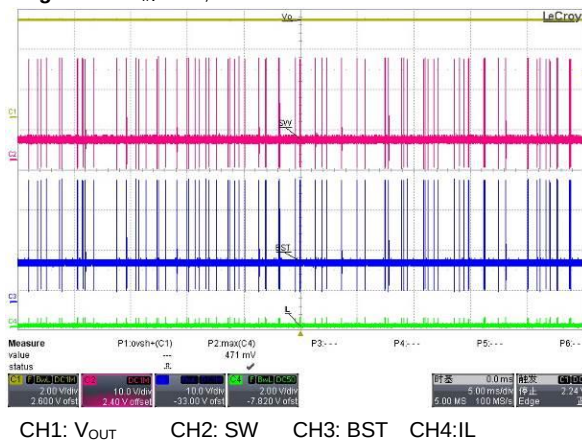
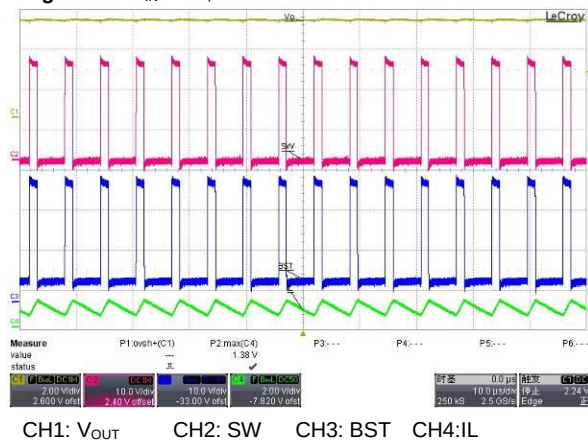
Figure 16: $V_{IN}=8V$, no load Normal

Figure 17: $V_{IN}=8V$, full load Normal

Figure 18: $V_{IN}=12V$, no load Normal

Figure 19: $V_{IN}=12V$, full load Normal

Figure 20: $V_{IN}=24V$, no load

Figure 21: $V_{IN}=24V$, full load


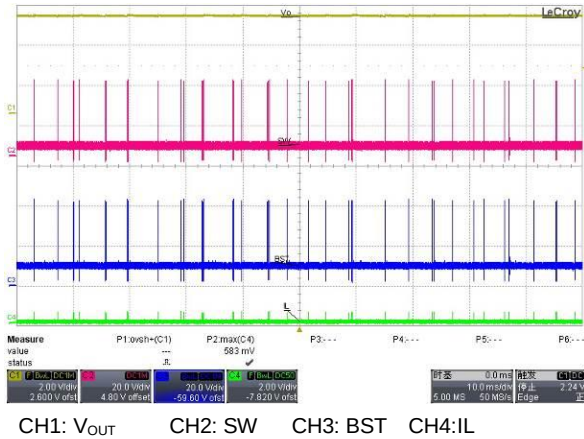
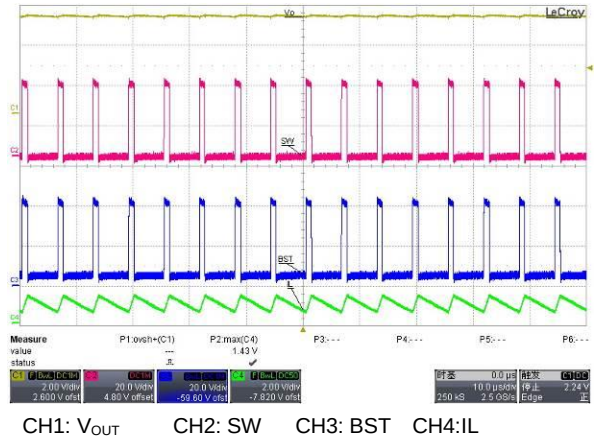
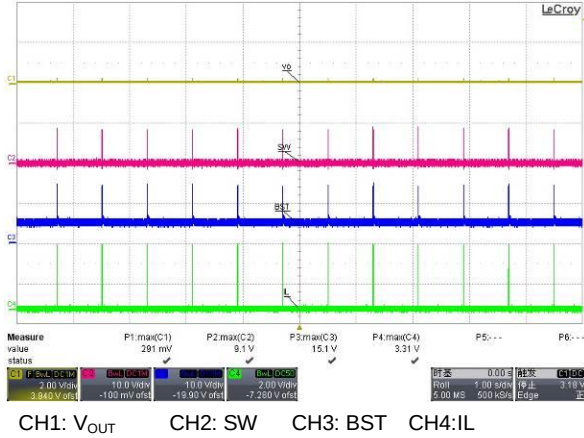
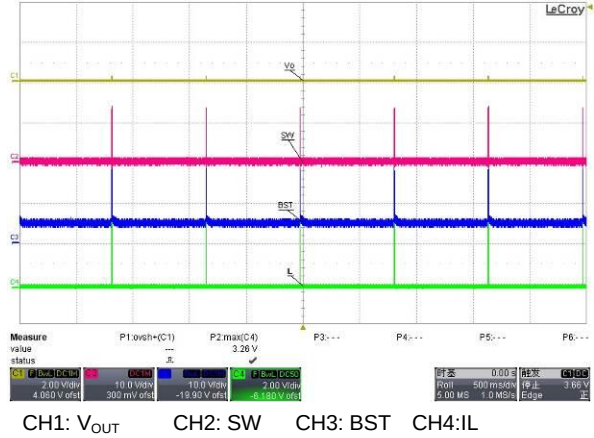
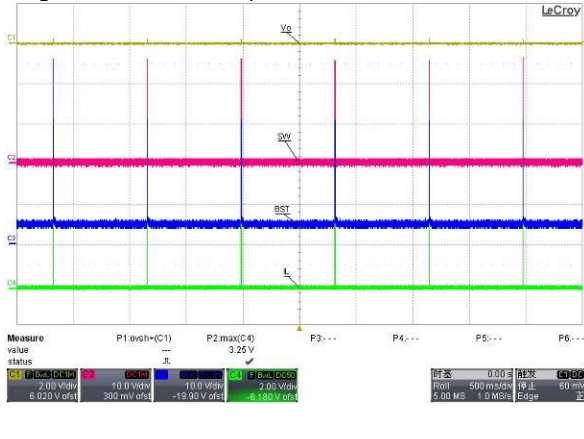
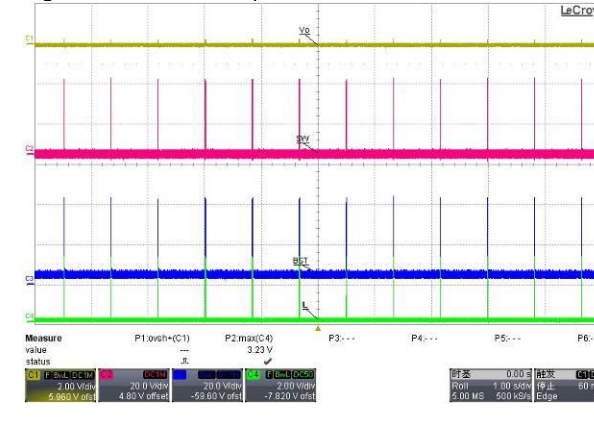
Figure 22: $V_{IN}=32V$, no load

Figure 23: $V_{IN}=32V$, full load

Figure 24: $V_{IN}=8V$, Output short

Figure 25: $V_{IN}=12V$, Output short

Figure 26: $V_{IN}=24V$, Output short

Figure 27: $V_{IN}=32V$, Output short


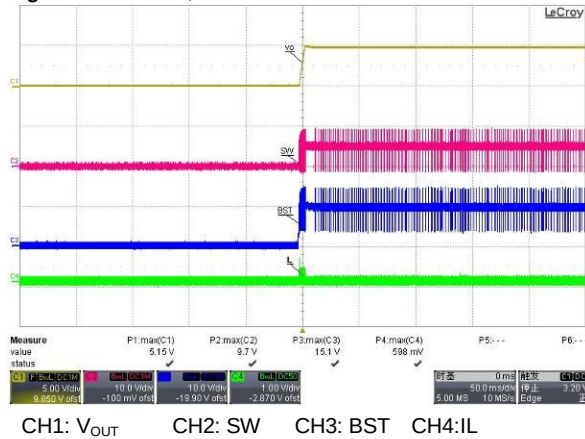
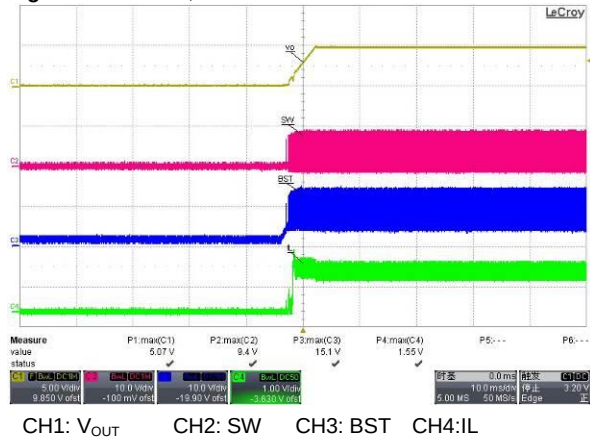
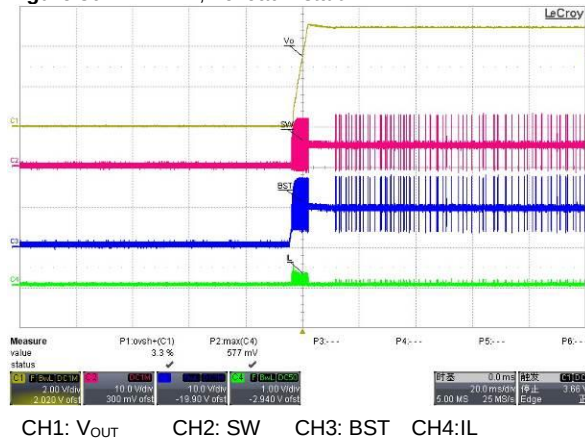
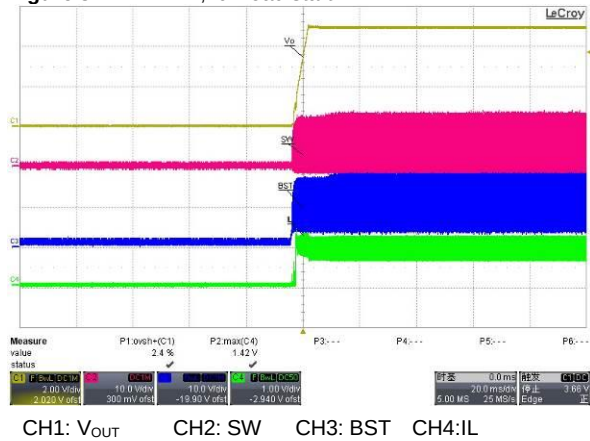
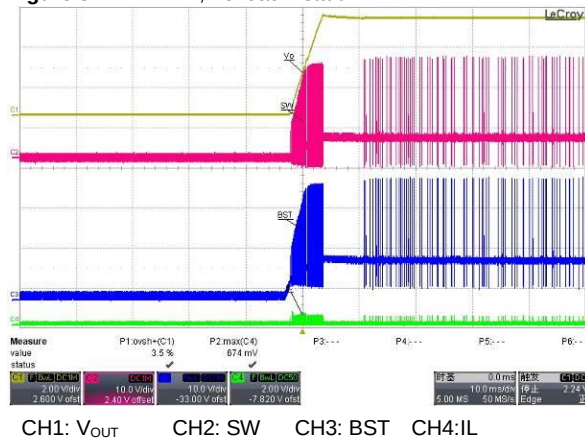
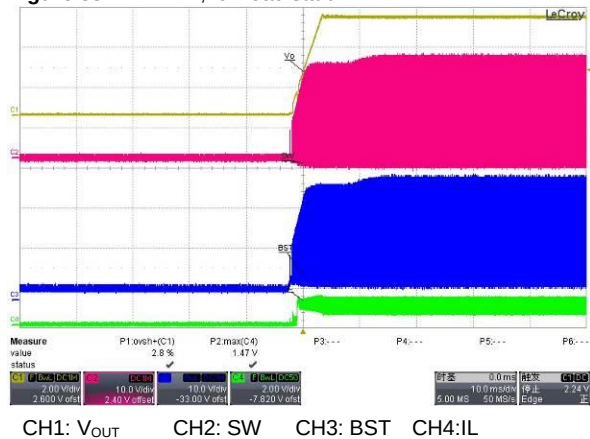
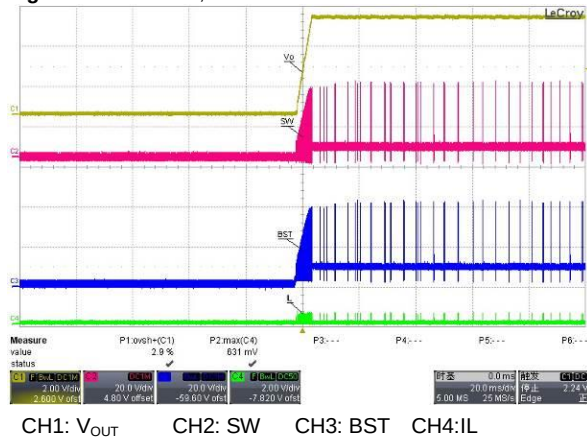
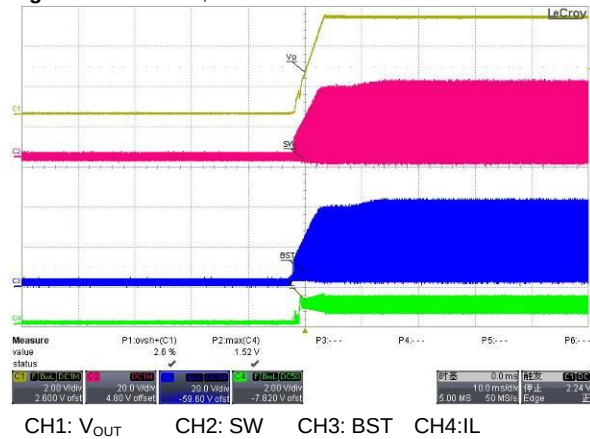
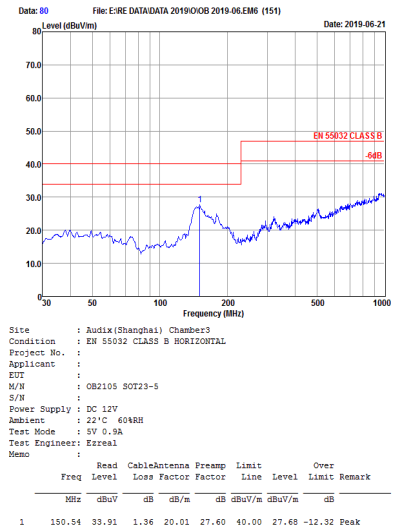
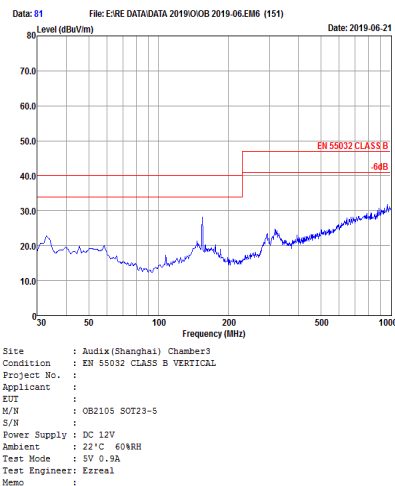
Figure 28: VIN=8V, no load start

Figure 29: VIN=8V, full load start

Figure 30: VIN=12V, no load start

Figure 31: VIN=12V, full load start

Figure 32: VIN=24V, no load start

Figure 33: VIN=24V, full load start


Figure 34: VIN=32V, no load start

Figure 35: VIN=32V, full load start


3.7 Radiation EMI Test

EN55022 CLASS B @ full load report

The Power supply passed EN55022 Class B EMI requirement with more than 6dB margin @ VIN 12V



3.8 Thermal Test

Test method: Input Voltage 8V/12V/24V/32V, Output power 5V/0.9A, Ambient temperature 40°C.

In the box of 11.4cm*8.5cm*4.3cm.

IC Temperature rise as follows:

Input Voltage (V)	IC Temperature rise ΔT (°C) @ LOAD=5V/0.9A
8	38.6
12	40.4
24	50.3
32	60.5

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