

SGM61450 Demo Board Test Report

4.5V to 42V Input, 3.3V/5A Output

Demo Board Layout:

Top



Bottom

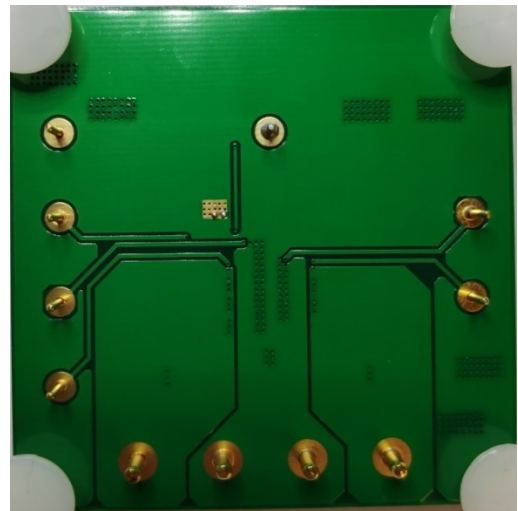


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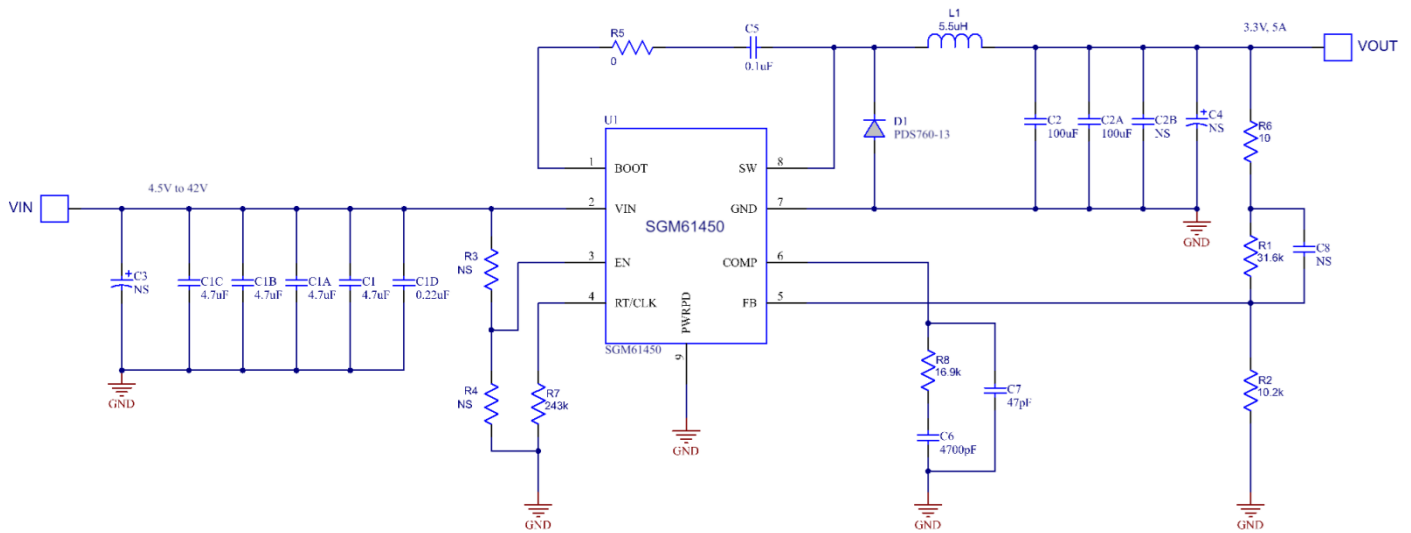
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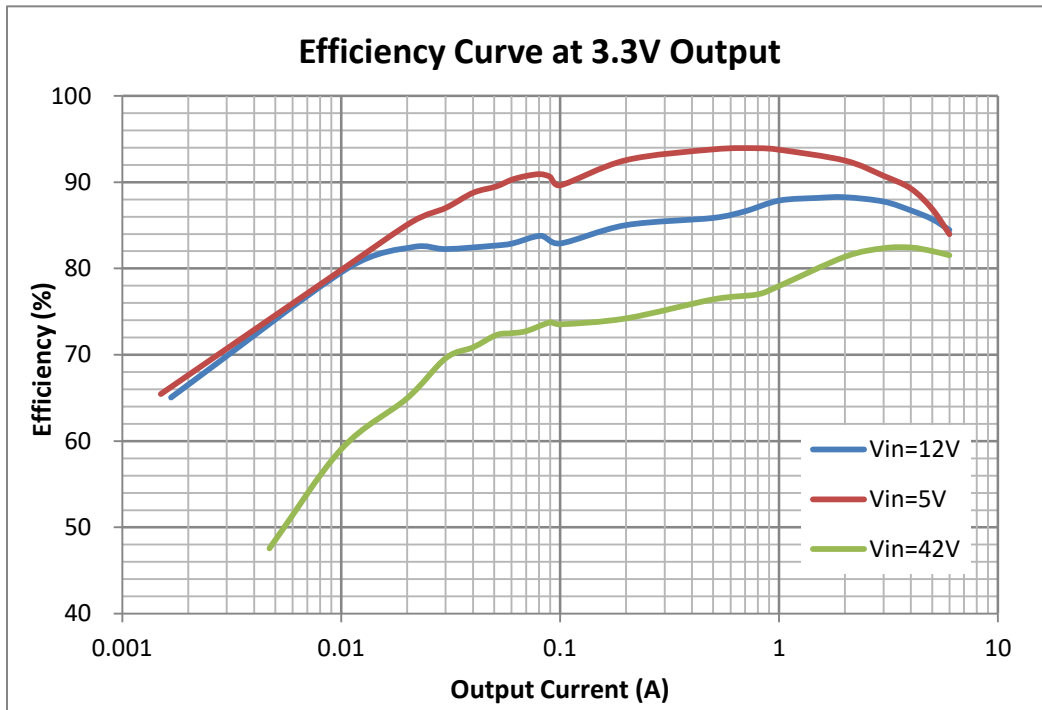
1. Schematic and BOM List



Item	QTY	Reference	Description
1	4	C1,C1A,C1B,C1C	Ceramic capacitor, 4.7 μ F, 50V, X7R, 1206
2	1	C1D	Ceramic capacitor, 0.22 μ F, 50V, X7R, 0805
3	2	C2,C2A	Ceramic capacitor, 100 μ F, 10V, X5R, 1206
4	0	C2B, C3,C4	NS
5	1	C5	Ceramic capacitor, 0.1 μ F, 16V, X7R, 0603
6	1	C6	Ceramic capacitor, 4.7nF, 50V, X7R, 0603
7	1	C7	Ceramic capacitor, 47pF, 50V, C0G, 0603
8	0	C8	NS
9	1	D1	Diode, Schottky, 60V, 7A, PDS760-13
10	1	L1	5.5 μ H, Irms=10A, Isat=12A, DCR=10.3m Ω , Wurth 744325550
11	1	R1	Resistor, 31.6k Ω , 1%, 1/10W, 0603
12	1	R2	Resistor, 10.2k Ω , 1%, 1/10W, 0603
13	0	R3,R4	NS
14	1	R5	Resistor, 0 Ω , 1%, 1/10W, 0603
15	1	R6	Resistor, 10 Ω , 1%, 1/10W, 0603
16	1	R7	Resistor, 243k Ω , 1%, 1/10W, 0603
17	1	R8	Resistor, 16.9k Ω , 1%, 1/10W, 0603
18	1	U1	SGM61450, 42V, 5A, non-synchronous buck converter, SOIC-8

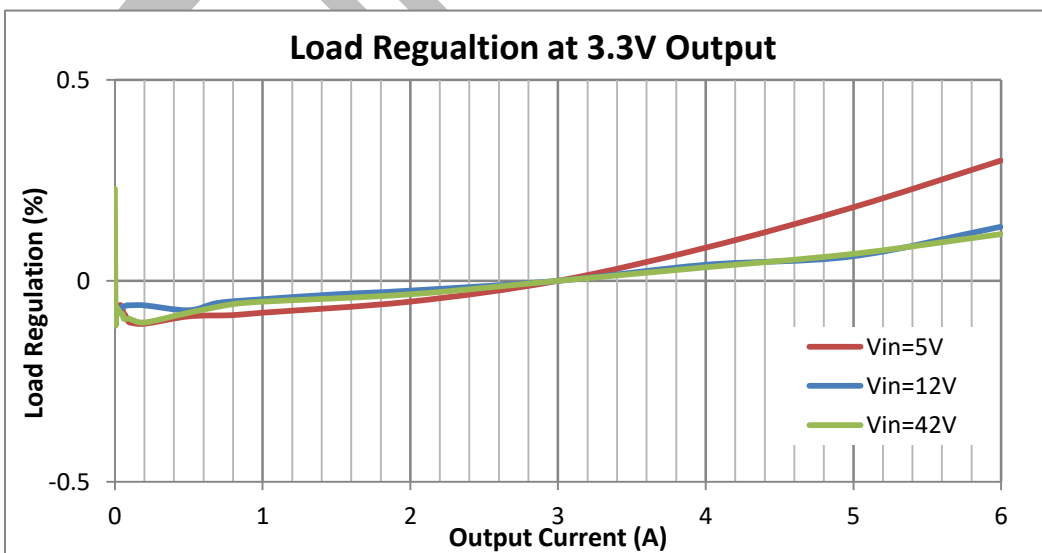
2. Efficiency

Test condition: $V_{OUT}=3.3V$, $L=5.5\mu H$, $DCR=10.3m\Omega$, measure the efficiency at different V_{IN} and I_{LOAD} .



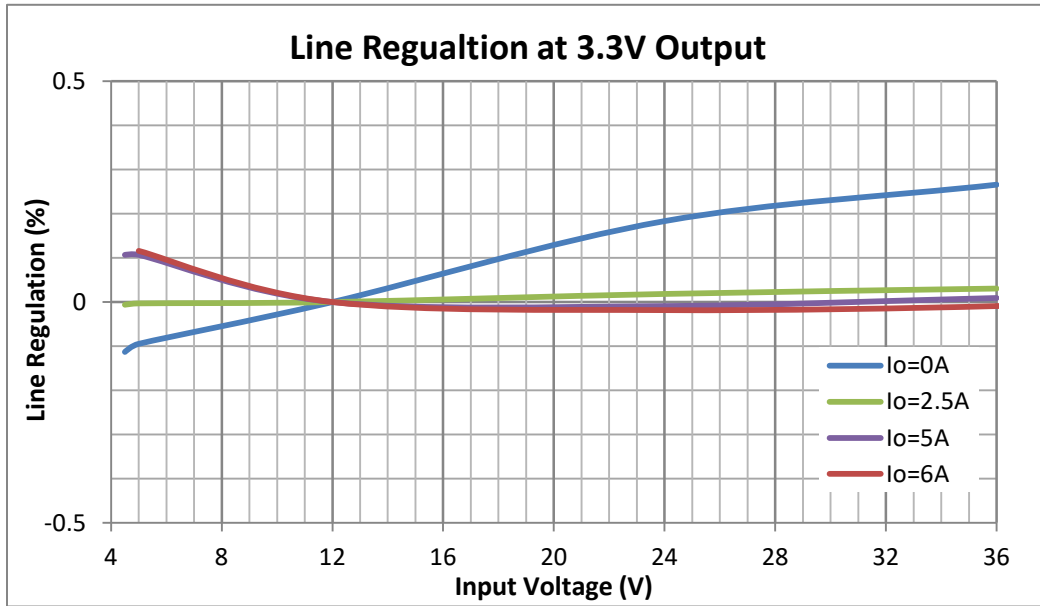
3. Load Regulation

Test condition: $V_{IN}=5V/12V/42V$, $V_{OUT}=3.3V$, measure output voltage with different I_{LOAD} .



4. Line Regulation

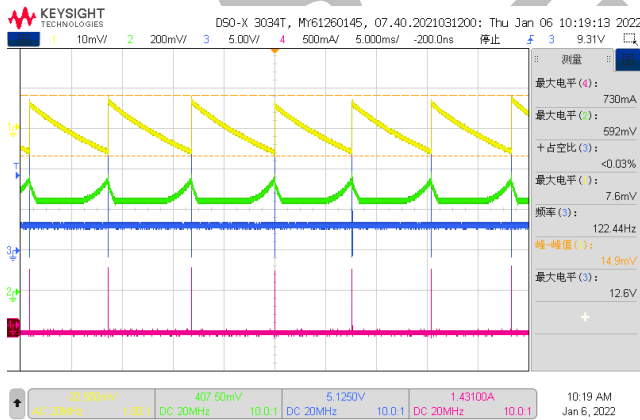
Test condition: $V_{OUT}=3.3V$, $I_{LOAD}=0A/2.5A/5A/6A$, measure output voltage at different V_{IN} .



5. Output Voltage Ripple

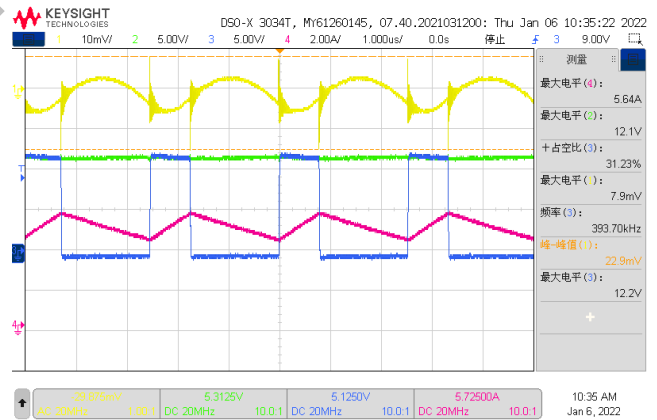
Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V$.

$I_O=0A$



Ch1- V_{OUT}/AC , Ch2- V_{COMP} , Ch3- V_{SW} , Ch4- I_L

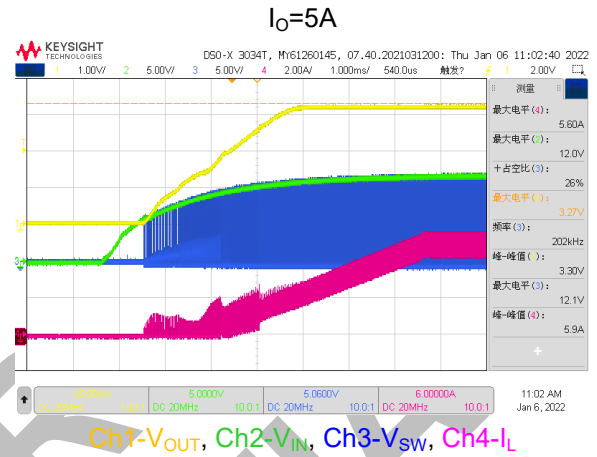
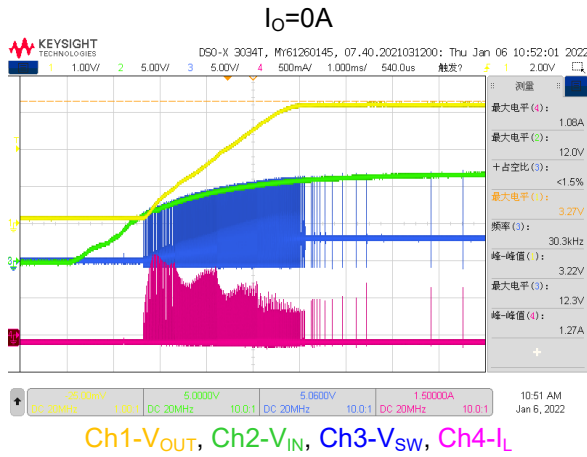
$I_O=5A$



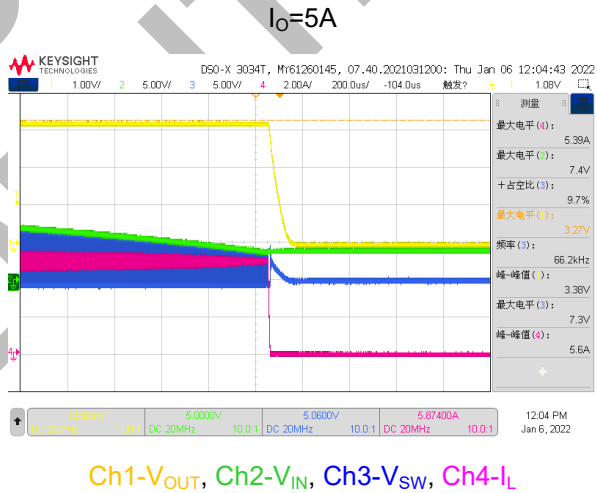
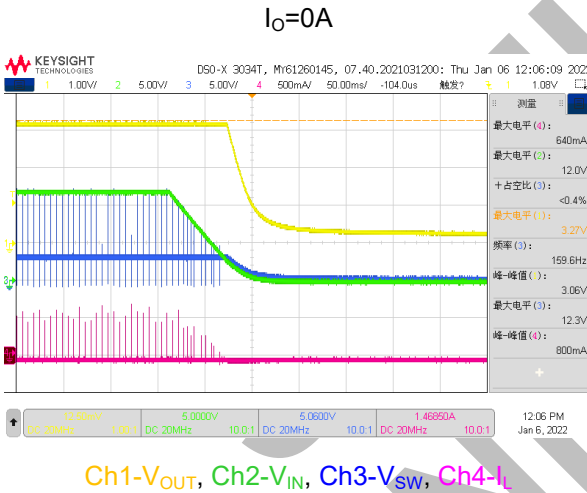
Ch1- V_{OUT}/AC , Ch2- V_{IN} , Ch3- V_{SW} , Ch4- I_L

6. V_{IN} on/off

Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V$, V_{IN} power on.

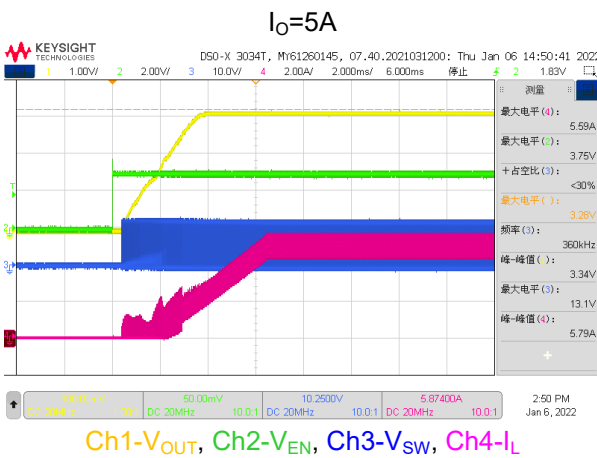
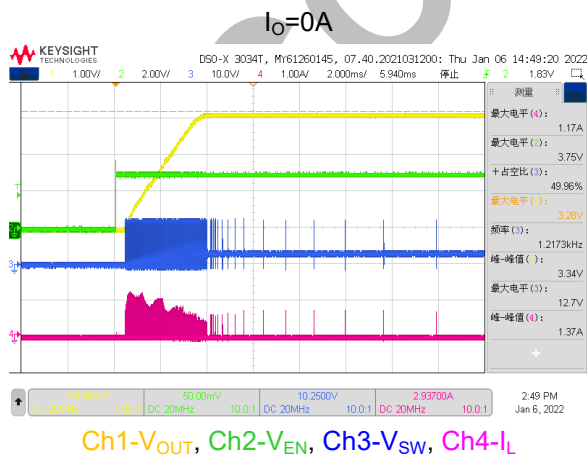


Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V$, V_{IN} power off.

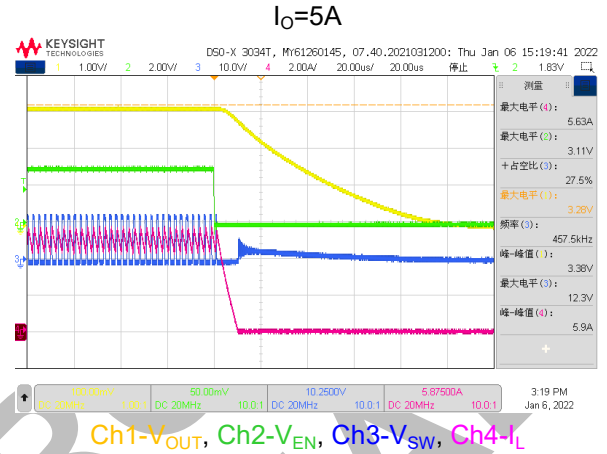
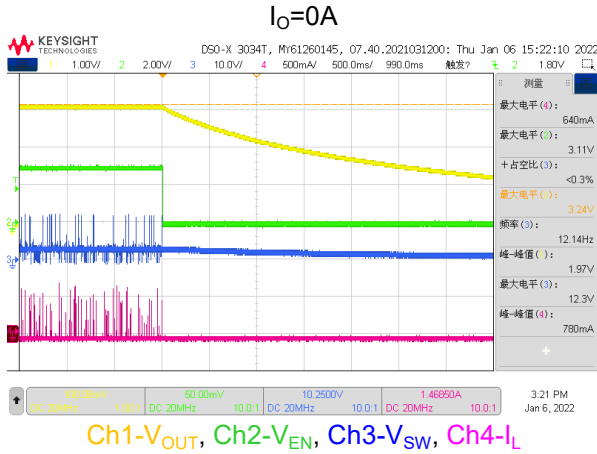


7. EN on/off

Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V$, EN on.

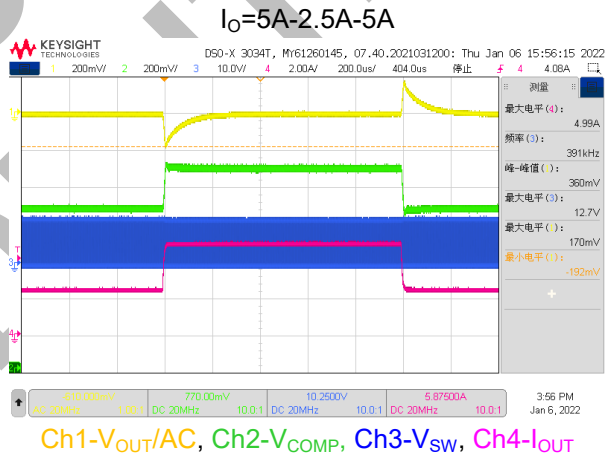
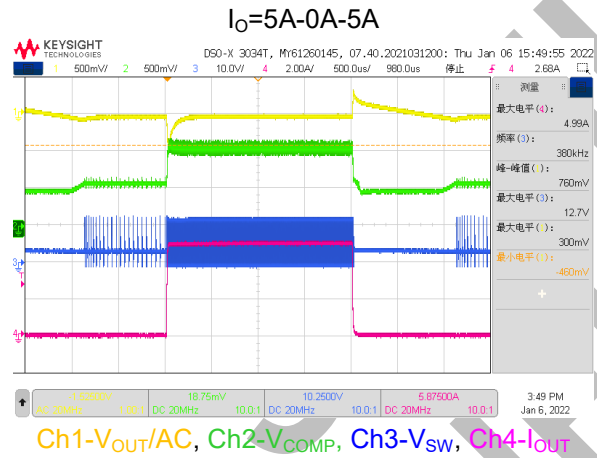


Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V$, EN off.



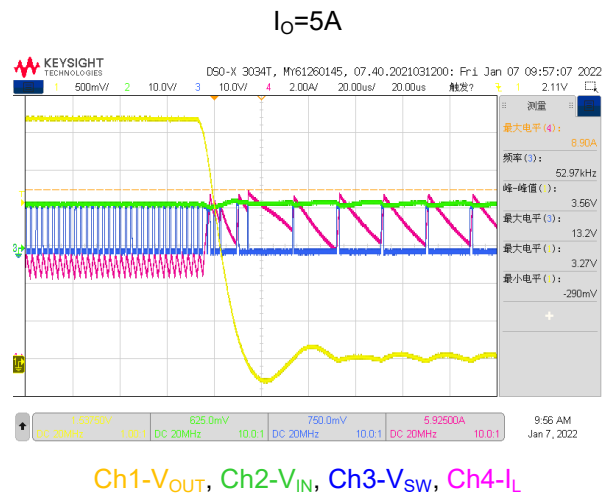
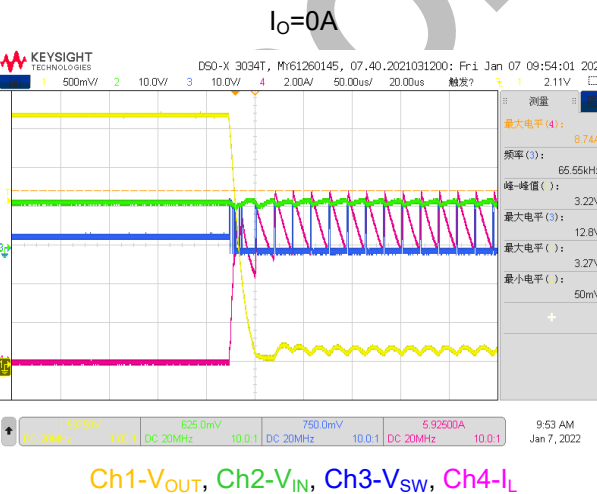
8. Load Transient

Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V$, E-load slew rate is 2.5A/us.

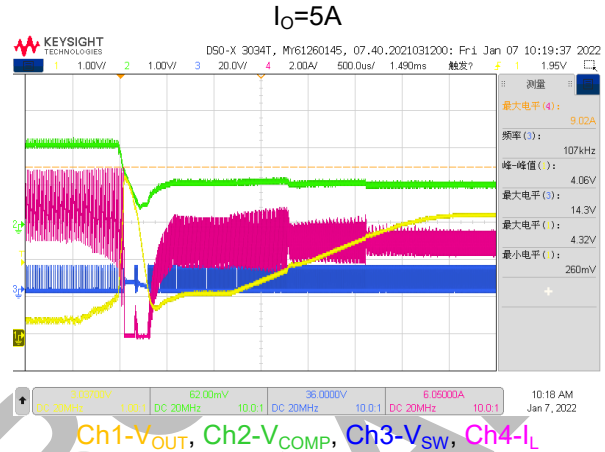
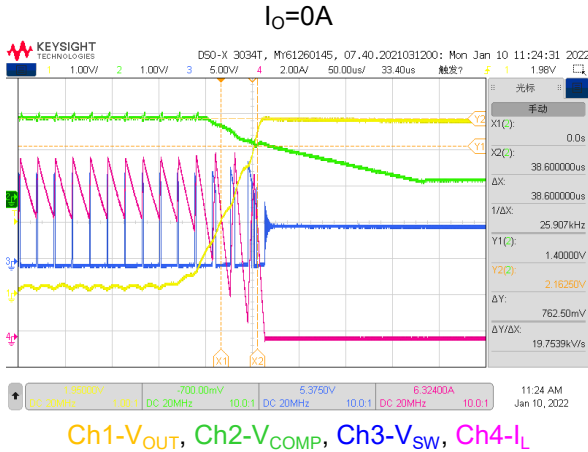


9. SCP Entry/Recovery

Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V$, short V_O to GND, SCP entry.

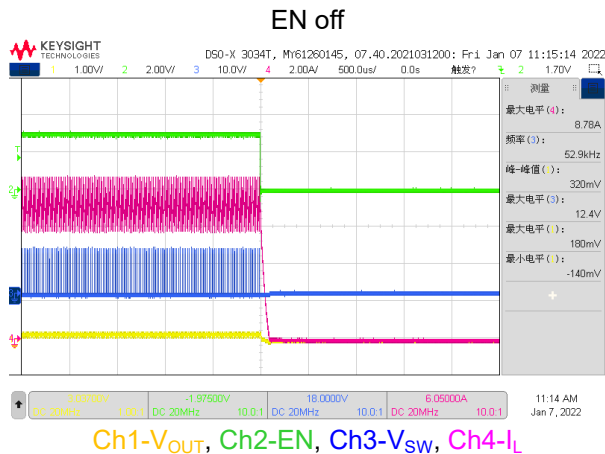
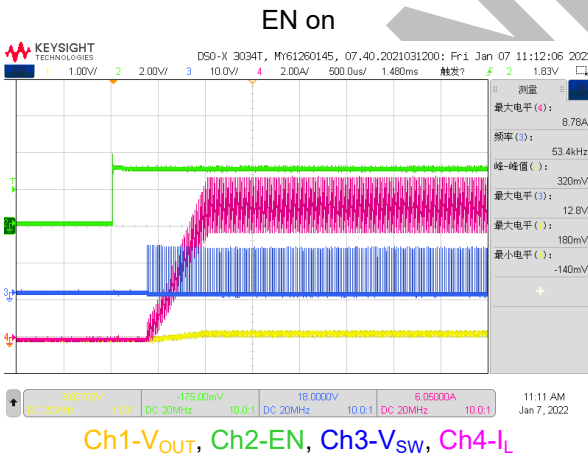
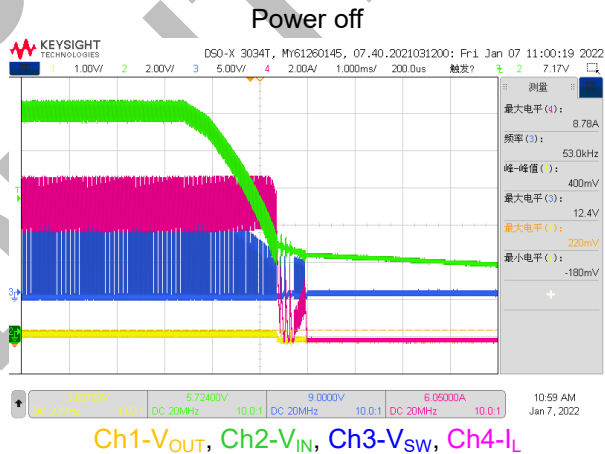
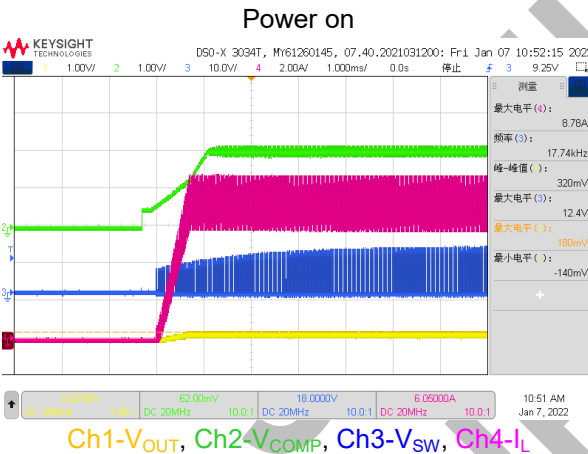


Test condition: $V_{IN}=12V$, $V_O=3.3V$, short V_O to GND, SCP recovery.



10. SCP power/EN on/off

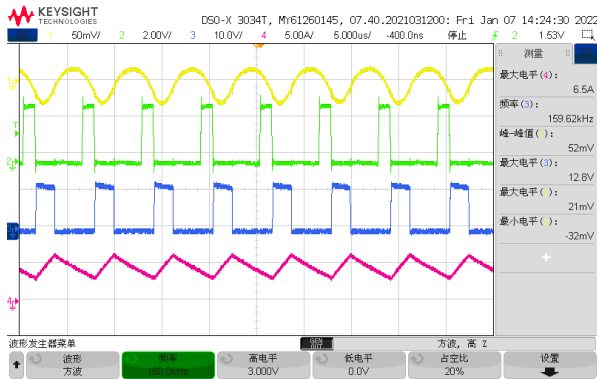
Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V$, short V_O to GND.



11. Synchronize to External Clock

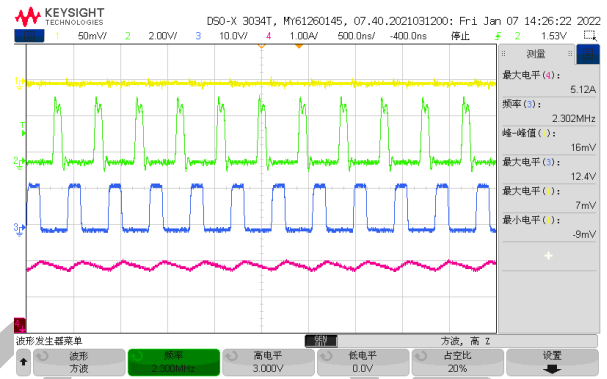
Test condition: $V_{IN}=12V$, $V_{OUT}=3.3V/5A$. External SYNC signal amplitude is 3V.

$f_{SYNC}=160kHz$



Ch1- $V_{OUT/AC}$, Ch2- V_{SYNC} , Ch3- V_{SW} , Ch4- I_L

$f_{SYNC}=2.3MHz$



Ch1- V_{EN} , Ch2- V_{SYNC} , Ch3- V_{SW} , Ch4- I_L

12. Thermal Test

Test condition: $V_{IN}=5/12/42V$, $V_{OUT}=3.3V$, measure the case temperature (T_c) rise with $I_o=0A$ to $I_o=6A$.

