

SGM61180 Demo Board Test Report

4.5V to 18V Input (12V TYP), 3.3V/8A Output

Demo Board Pictures:

Top



Bottom

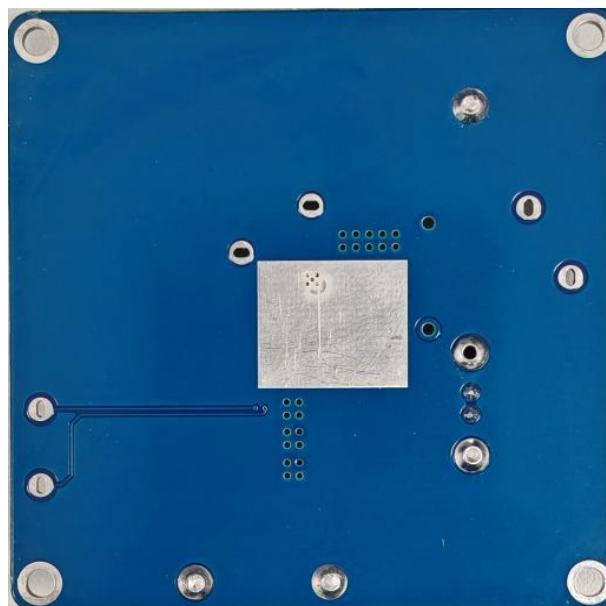
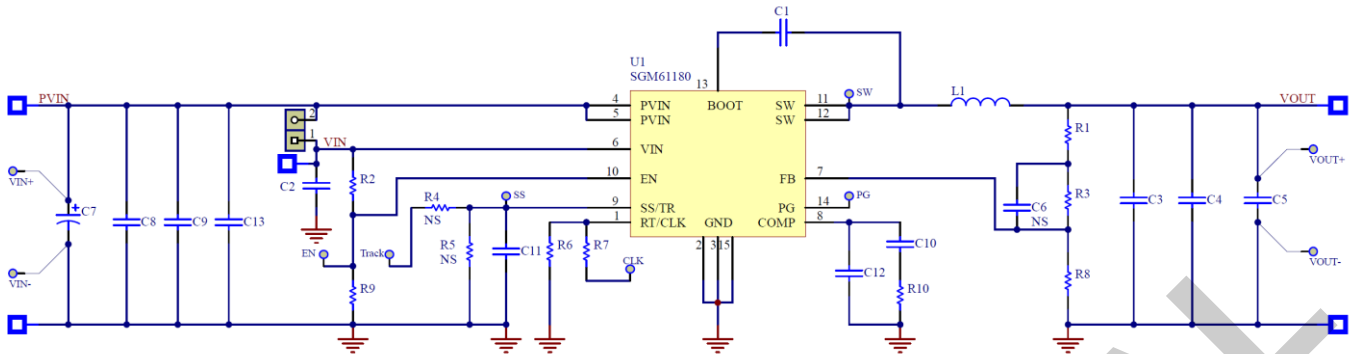


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1. Schematic, BOM List and PCB Layout

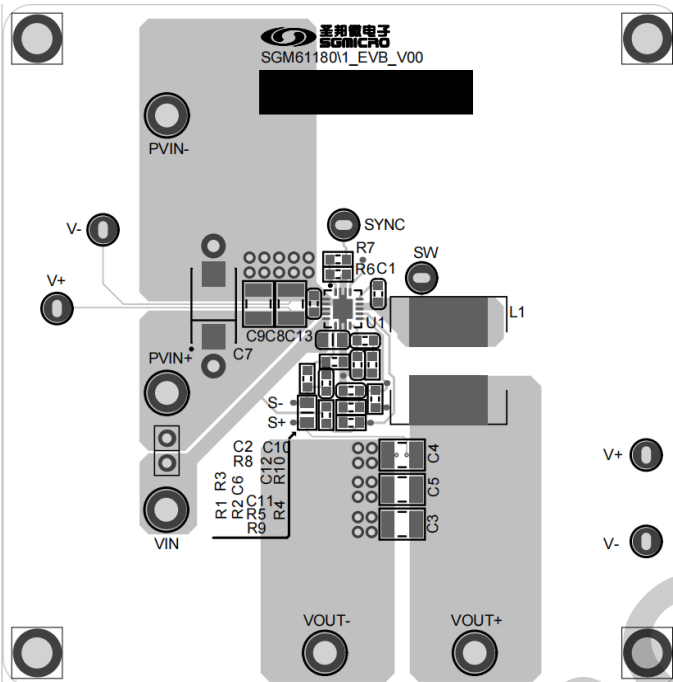
1.1 Schematic



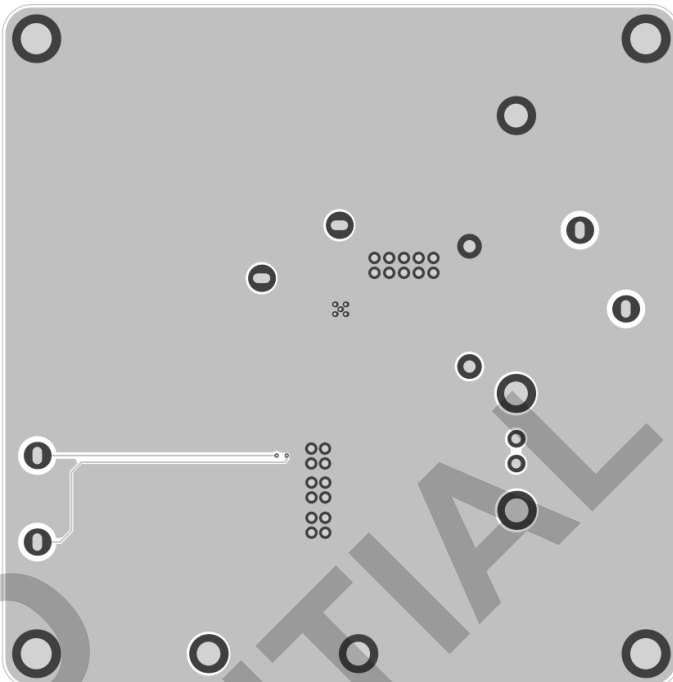
1.2 BOM List

Item	Quantity	Designator	Description	Manufactory
1	2	C1,C13	Ceramic capacitor, 0.1 μ F, 25V, X7R, $\pm$ 10%, 0603	muRata
2	1	C2	Ceramic capacitor, 4.7 μ F, 25V, X5R, $\pm$ 10%, 0805, GRM219R61E475KA73	muRata
3	3	C3,C4,C5	Ceramic capacitor, 47 μ F, 10V, X7R, $\pm$ 10%, 1210, GRM32ER71A476KE15	muRata
4	0	C6	NC	/
5	1	C7	Solid Electrolytic capacitor, 100 μ F, 35V	Standard
6	1	C8	Ceramic capacitor, 10 μ F, 25V, X7R, $\pm$ 10%, 1210, GCM32ER71E106KA57	muRata
7	1	C9	Ceramic capacitor, 4.7 μ F, 50V, X7R, $\pm$ 10%, 1210, GCJ32ER71H475KA12	muRata
8	2	C10,C11	Ceramic capacitor, 10nF, 50V, C0G, $\pm$ 5%, 0603	muRata
9	1	C12	Ceramic capacitor, 22pF, 50V, C0G, $\pm$ 5%, 0603	muRata
10	1	L1	Ind., 3.3 μ H $\pm$ 20%, I _{RMS} (40K)=18.2A, I _{SAT} (30%)=24.7A, DCR _{TYP} =5.2m Ω , 7443320330	Würth
11	2	R1,R7	Film Resistor, 1%, 0 Ω , 0603	Standard
12	1	R2	Film Resistor, 1%, 56K Ω , 0603	Standard
13	1	R3	Film Resistor, 1%, 10K Ω , 0603	Standard
14	0	R4,R5	NC	/
15	1	R6	Film Resistor, 1%, 100K Ω , 0603	Standard
16	1	R8	Film Resistor, 1%, 2.21K Ω , 0603	Standard
17	1	R9	Film Resistor, 1%, 10.5K Ω , 0603	Standard
18	1	R10	Film Resistor, 1%, 3.3K Ω , 0603	Standard
19	1	U1	SGM61180, 8A, 18V, Synchronous Buck Converter	SGMICRO
Conclusion: Total 22 components				

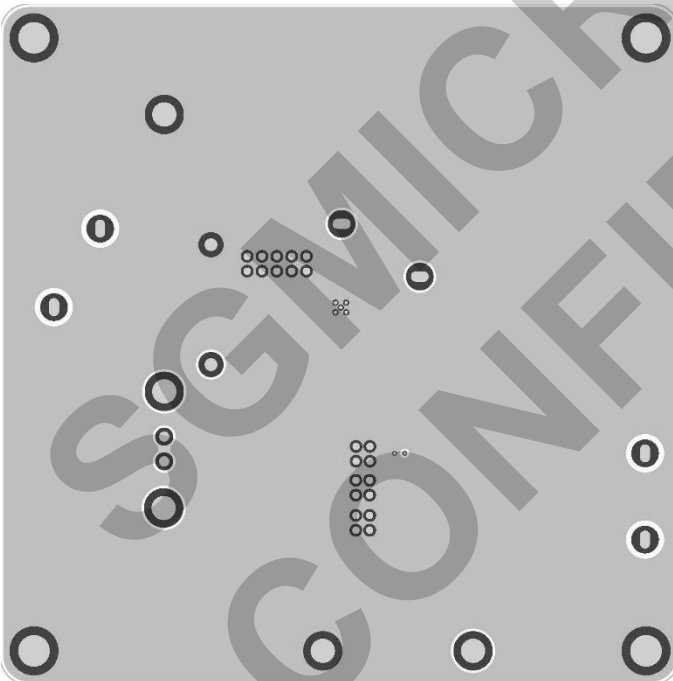
1.3 PCB Layout



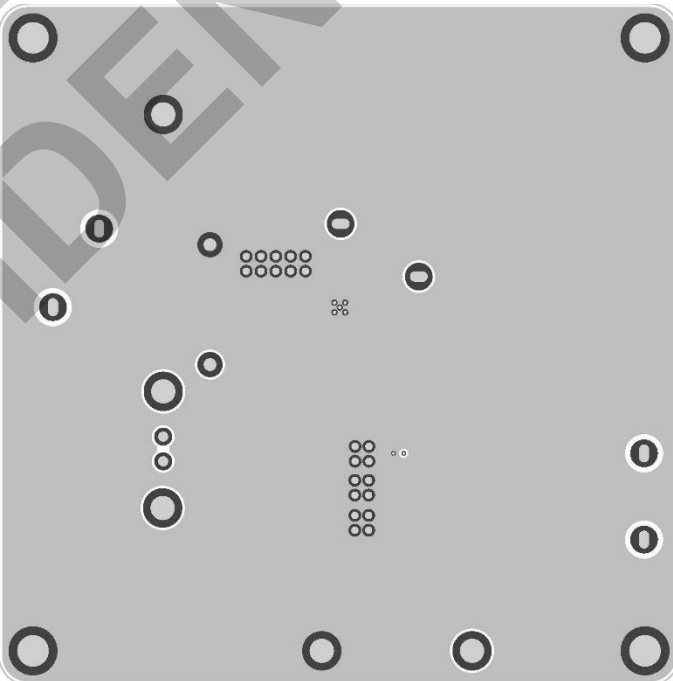
PCB Top Layer



PCB Bottom Layer



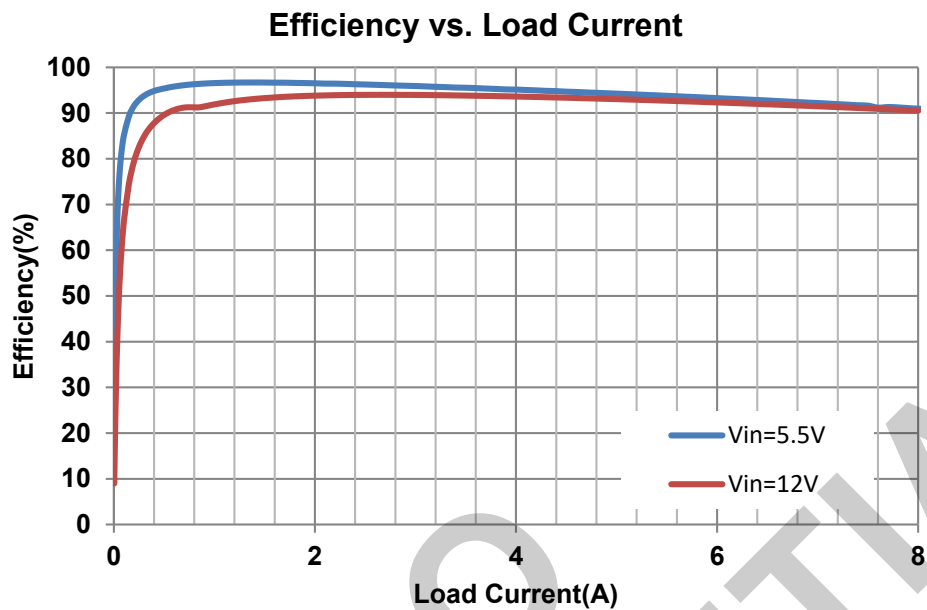
PCB Middle Layer 1



PCB Middle Layer 2

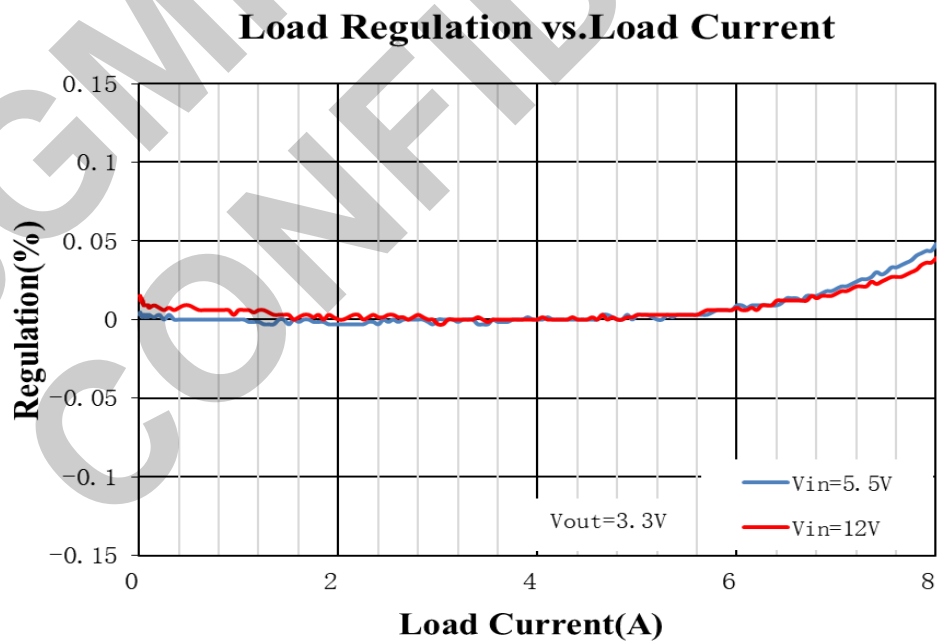
2. Efficiency

Test conditions: $V_{IN}=5.5V/12V$, $V_{OUT}=3.3V$, $I_{OUT}=0.01A\sim 8A$.



3. Load Regulation

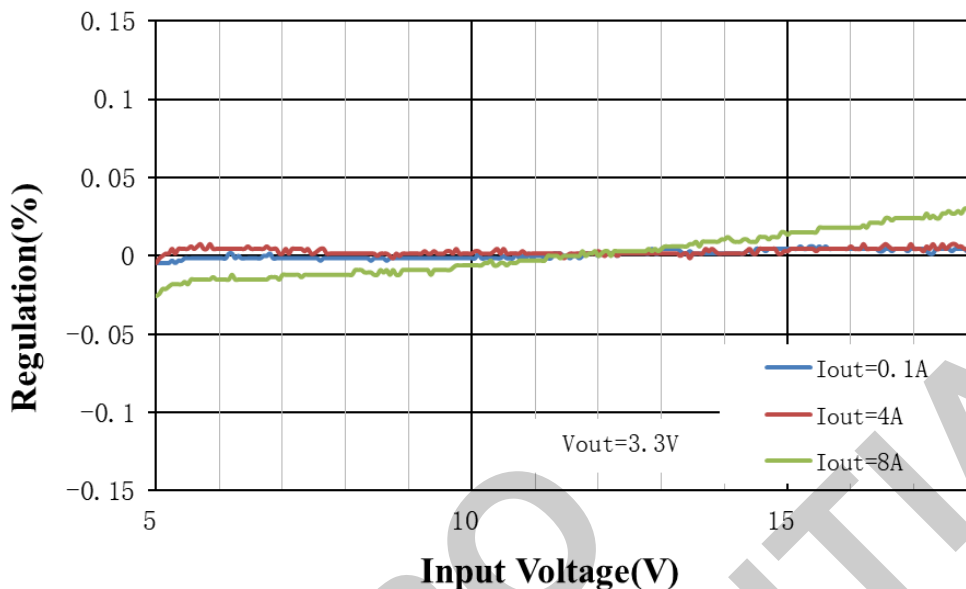
Test conditions: $V_{IN}=5.5V/12V$, $V_{OUT}=3.3V$, $I_{OUT}=0A\sim 8A$.



4. Line Regulation

Test conditions: $V_{IN}=5V\sim 18V$, $V_{OUT}=3.3V$, $I_{OUT}=0.1A/4A/8A$.

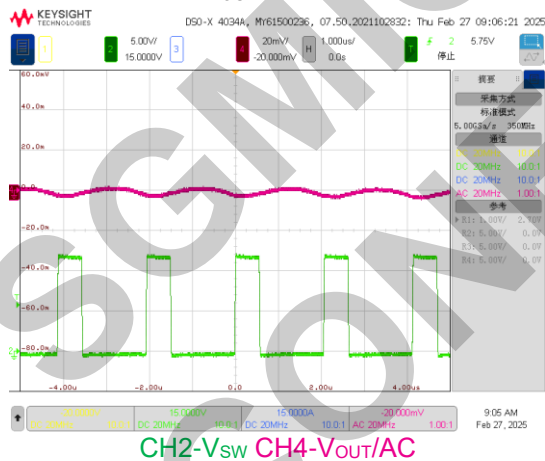
Line Regulation vs. Input Voltage



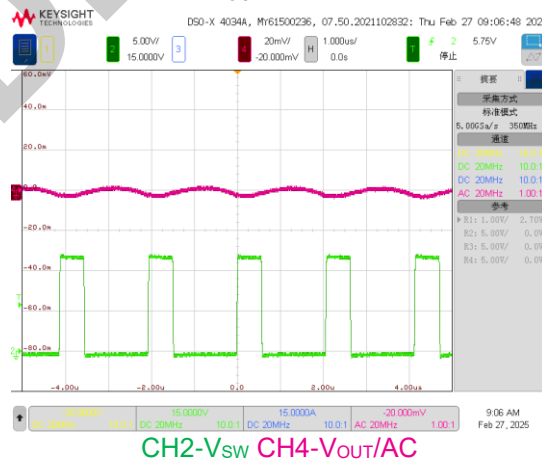
5. Output Voltage Ripple

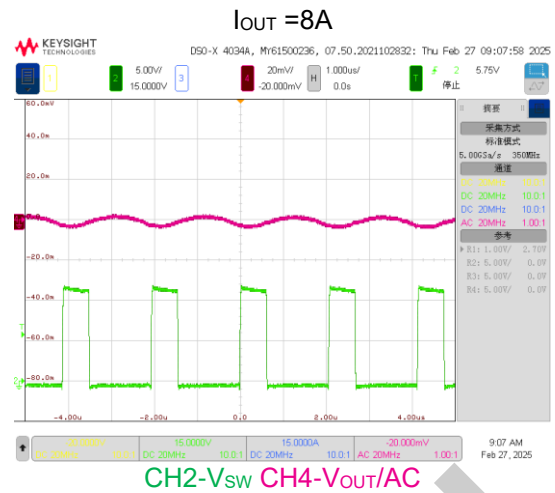
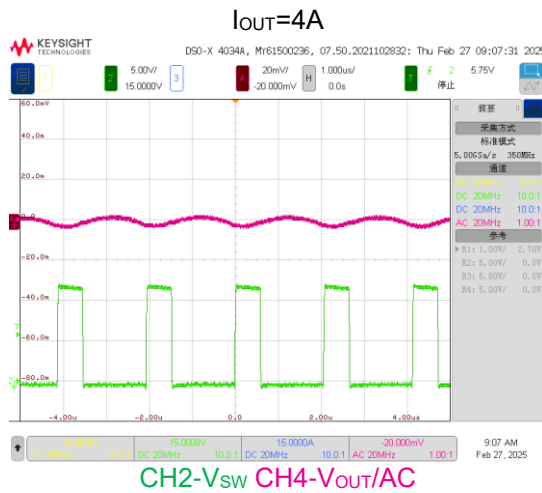
Test conditions: $V_{IN}=12V$, $V_{OUT}=3.3V$.

$I_{OUT}=0.01A$



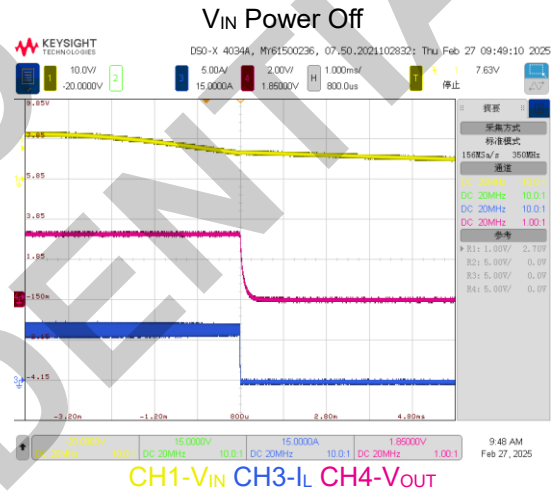
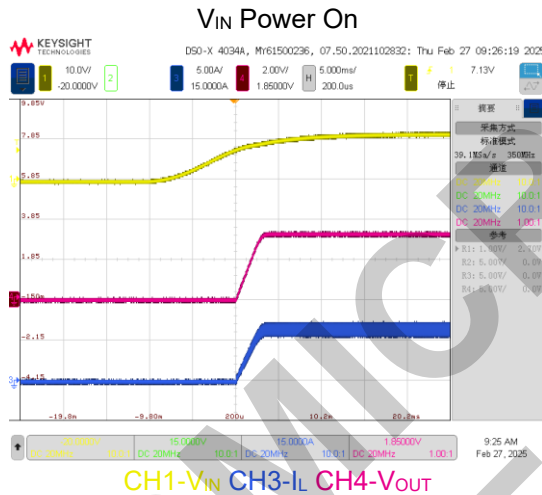
$I_{OUT}=0.5A$





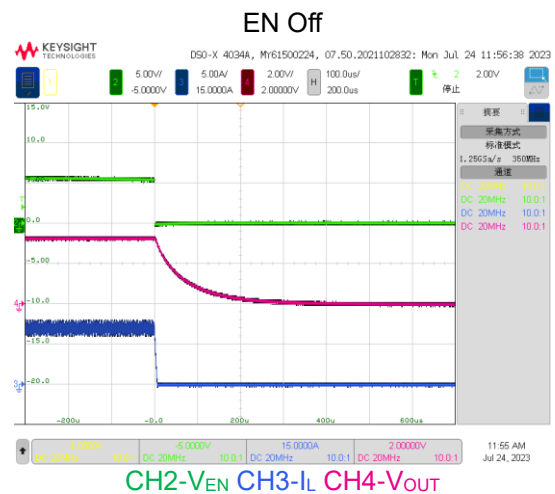
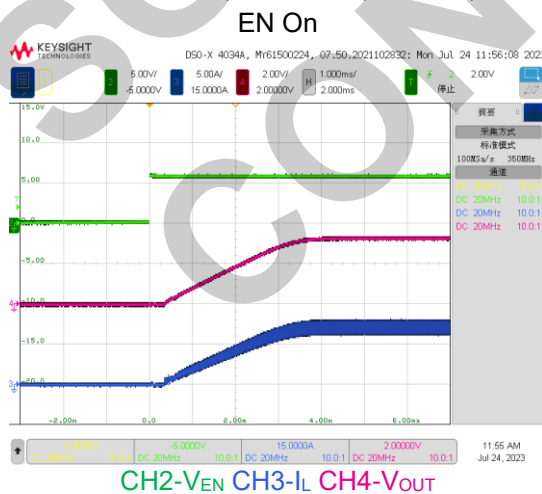
6. VIN Power On/Off

Test conditions: $V_{IN}=12V$, $V_{OUT}=3.3V$, $I_{OUT}=8A$, V_{IN} Power On/Off.



7. EN On/Off

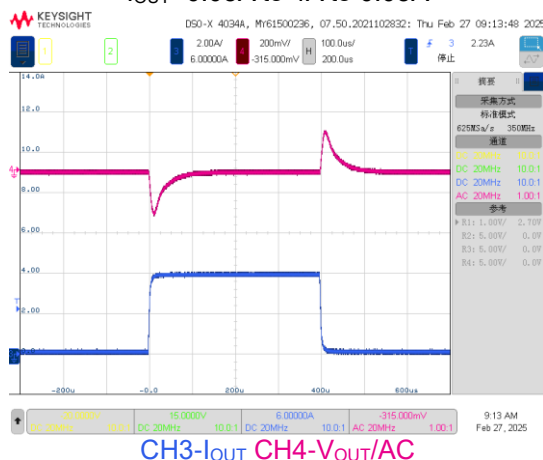
Test conditions: $V_{IN}=12V$, $V_{OUT}=3.3V$, $I_{OUT}=8A$, EN On/Off.



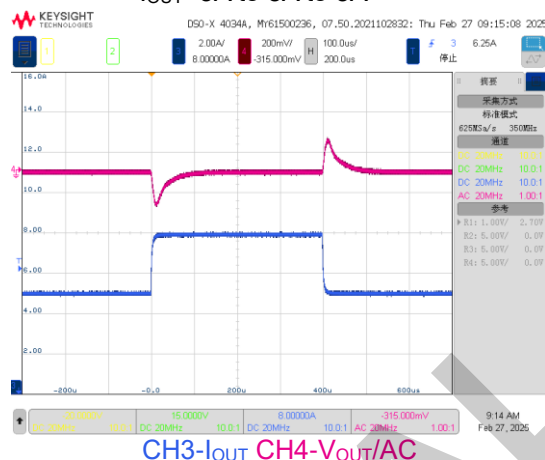
8. Load Transient

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

$I_{OUT}=0.05A$ to $4A$ to $0.05A$



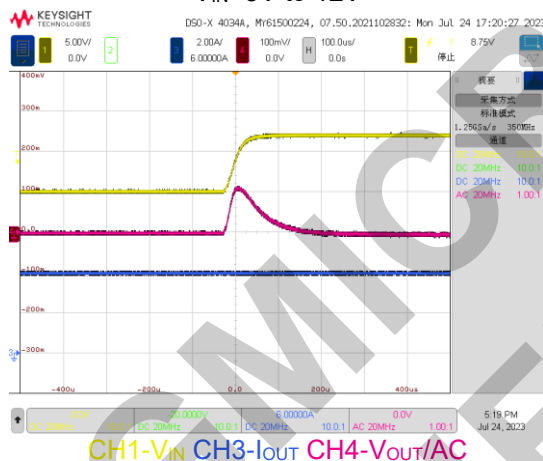
$I_{OUT}=5A$ to $8A$ to $5A$



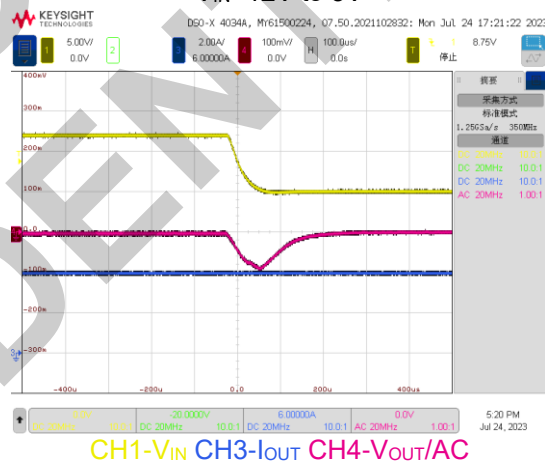
9. Line Transient

Test conditions: $V_{OUT}=3.3V$, $I_{OUT}=4A$, EN Floating.

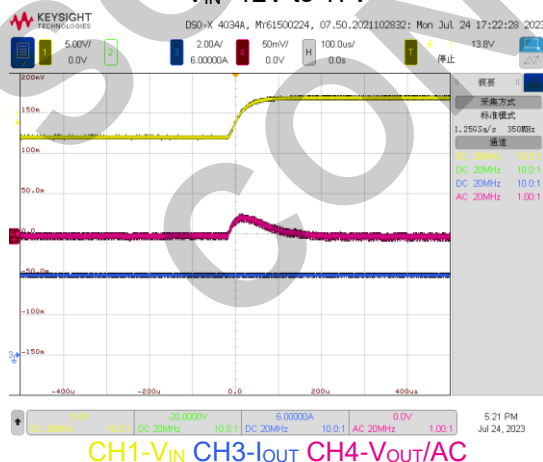
$V_{IN}=5V$ to $12V$



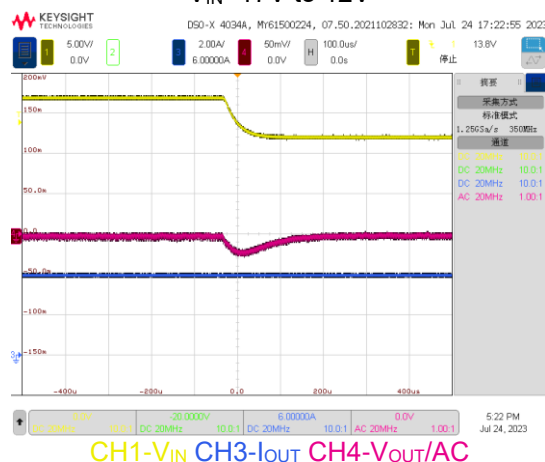
$V_{IN}=12V$ to $5V$



$V_{IN}=12V$ to $17V$



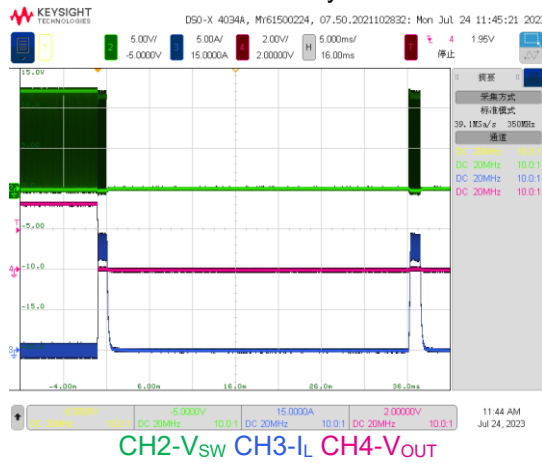
$V_{IN}=17V$ to $12V$



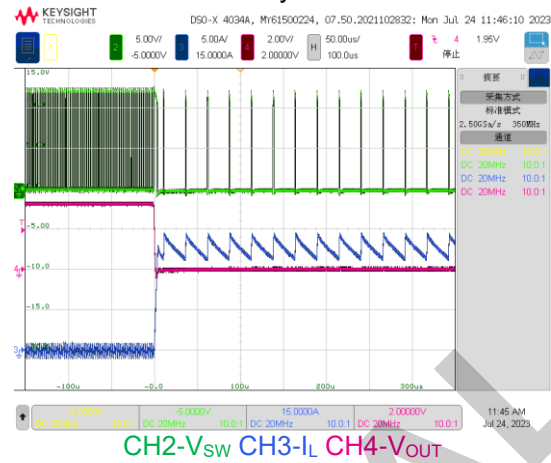
10. SCP Entry, Recovery and OTP Entry

Test conditions: $V_{IN}=12V$, $V_{OUT}=3.3V$, Output Shorted.

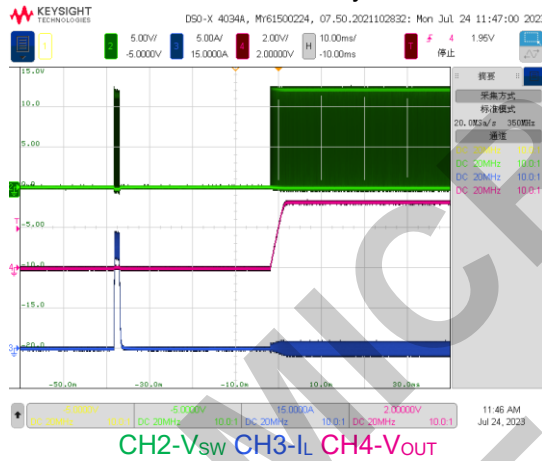
SCP Entry



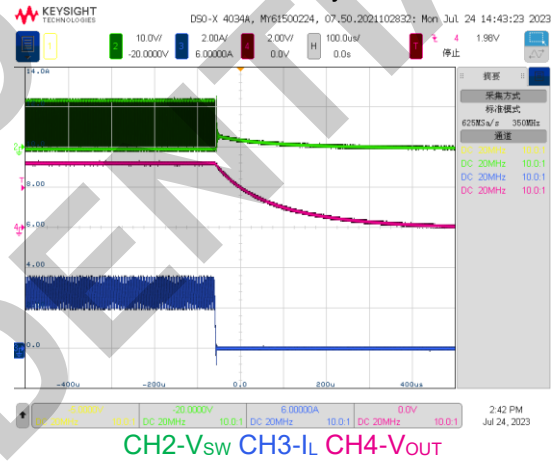
SCP Entry Zoom in



SCP Recovery

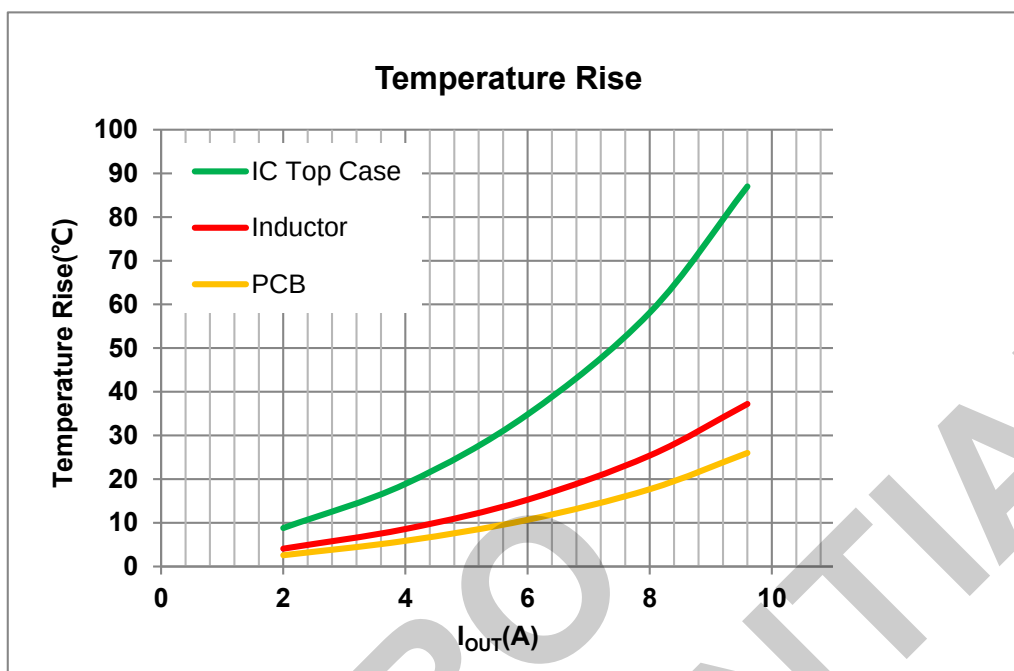


OTP Entry



11. Thermal Test

Test conditions: $V_{IN}=12V$, $V_{OUT}=3.3V$, Room temperature test, Natural air convection heat dissipation.



$I_{OUT}(A)$	2	4	6	8	9.6
IC Top Case(°C)	36.9	46.9	62.9	86.7	115.6
Inductor(°C)	32.2	36.6	43.4	54	65.8
PCB(°C)	30.7	33.9	38.8	46.3	54.6
Ambient(°C)	28.1	28.0	28.1	28.6	28.6