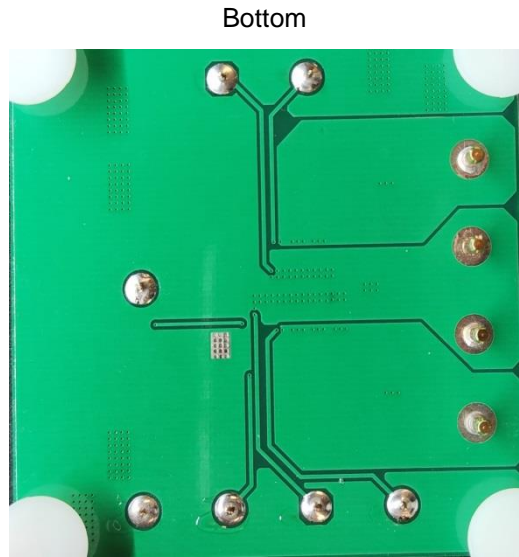
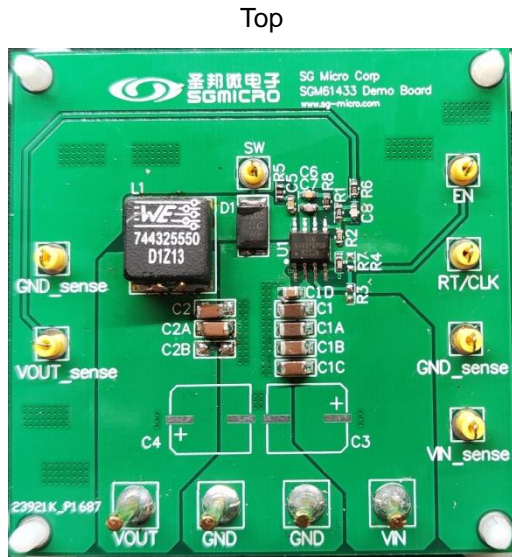


## SGM61433 Demo Board Test Report

4.5V to 42V Input, 3.3V/3.5A Output

**Demo Board Layout:**



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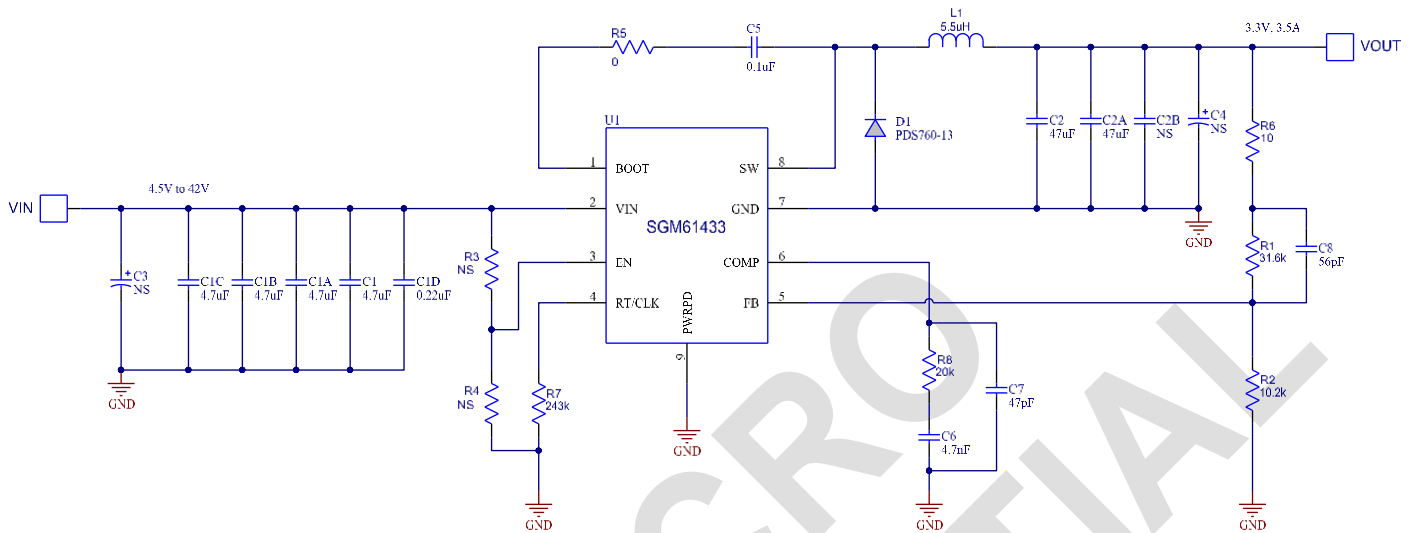
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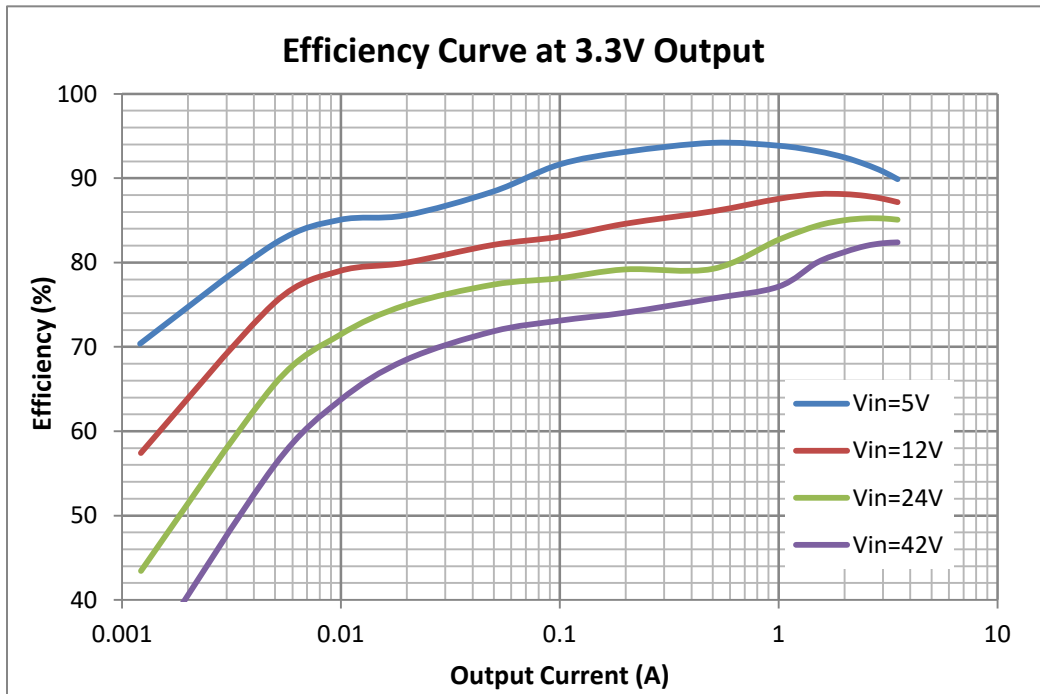
## 1. Schematic and BOM List



Item	QTY	Reference	Description
1	4	C1,C1A,C1B,C1C	Ceramic capacitor, 4.7μF, 50V, X7R, 1206
2	1	C1D	Ceramic capacitor, 0.22μF, 50V, X7R, 0805
3	2	C2, C2A	Ceramic capacitor, 47μF, 25V, X5R, 1206
4	0	C2B, C3,C4	NS
5	1	C5	Ceramic capacitor, 0.1μF, 16V, X7R, 0603
6	1	C6	Ceramic capacitor, 4.7nF, 50V, X7R, 0603
7	1	C7	Ceramic capacitor, 47pF, 50V, C0G, 0603
8	1	C8	Ceramic capacitor, 56pF, 50V, C0G, 0603
9	1	D1	Diode, Schottky, 60V, 7A, PDS760-13
10	1	L1	5.5μH, Irms=10A, Isat=12A, DCR=10.3mΩ, Wurth 744325550
11	1	R1	Resistor, 31.6kΩ, 1%, 1/10W, 0603
12	1	R2	Resistor, 10.2kΩ, 1%, 1/10W, 0603
13	0	R3,R4	NS
14	1	R5	Resistor, 0Ω, 1%, 1/10W, 0603
15	1	R6	Resistor, 10Ω, 1%, 1/10W, 0603
16	1	R7	Resistor, 243kΩ, 1%, 1/10W, 0603
17	1	R8	Resistor, 20kΩ, 1%, 1/10W, 0603
18	1	U1	SGM61433, 42V, 3.5A, non-synchronous buck converter, SOIC-8

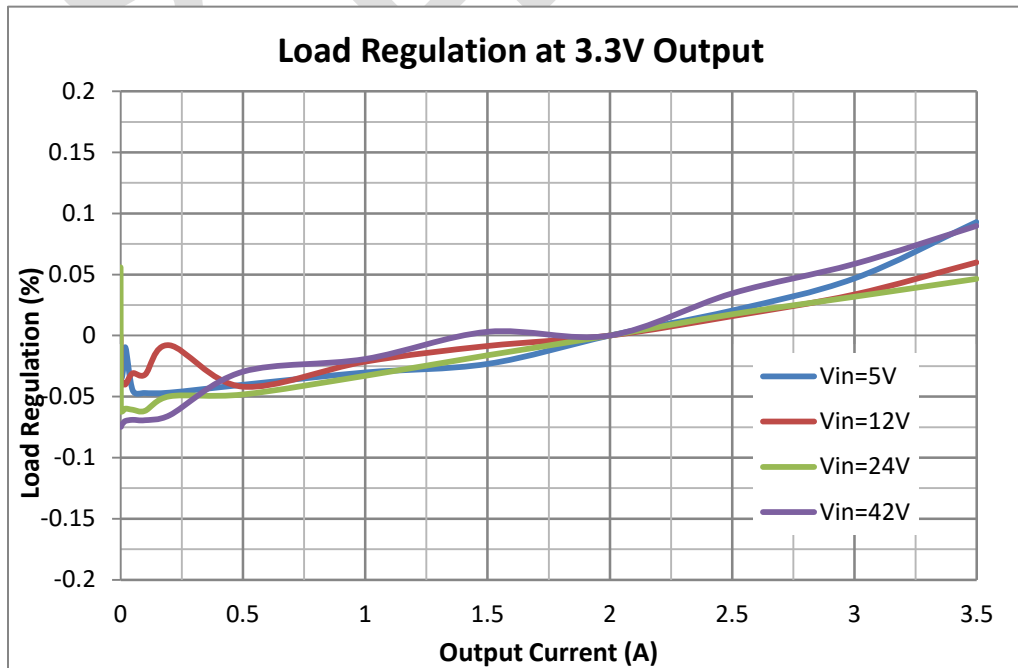
2. Efficiency

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



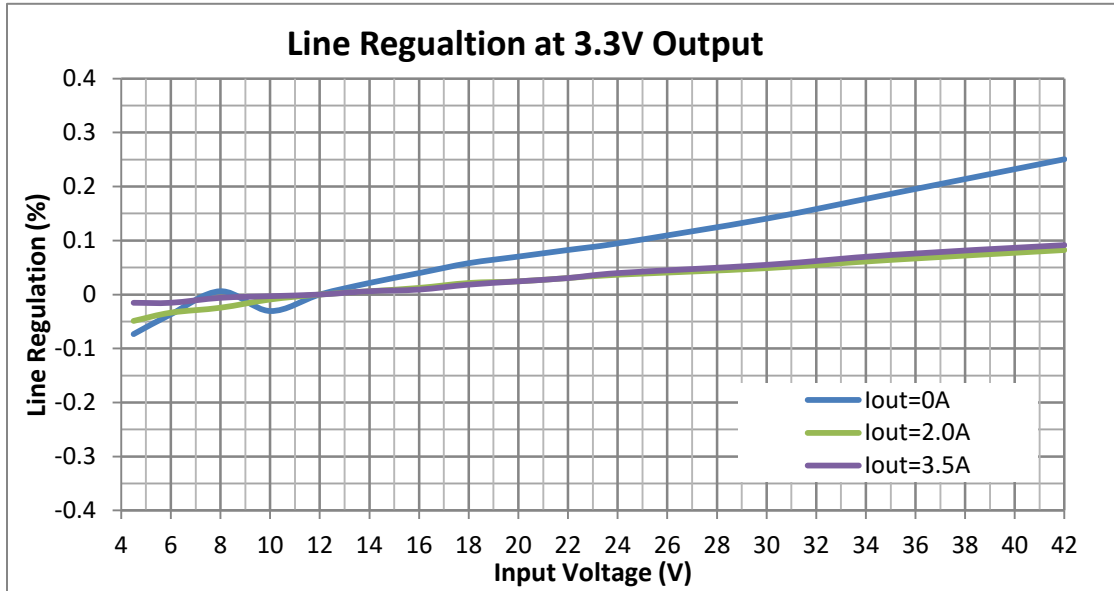
3. Load Regulation

Test condition:  $V_{IN}=5V/12V/24V/42V$ ,  $V_{OUT}=3.3V$ , measure output voltage with different  $I_{LOAD}$ .



## 4. Line Regulation

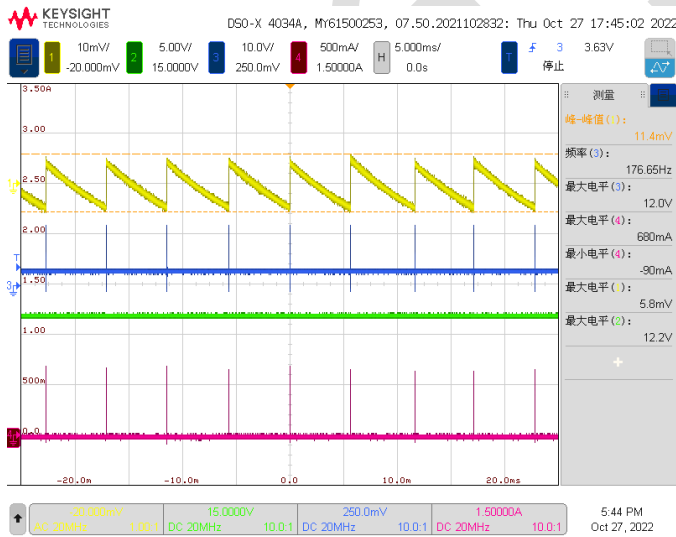
Test condition:  $V_{OUT}=3.3V$ ,  $I_{LOAD}=0A/2A/3.5A$ , measure output voltage at different  $V_{IN}$ .



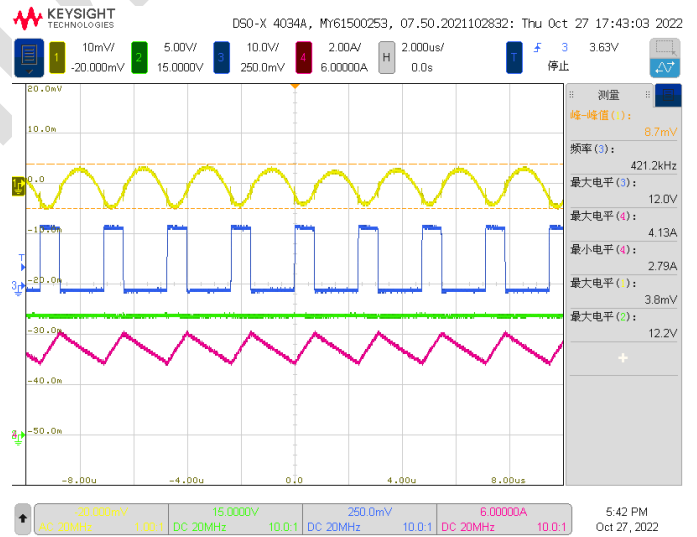
## 5. Output Voltage Ripple

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

$I_O=0A$



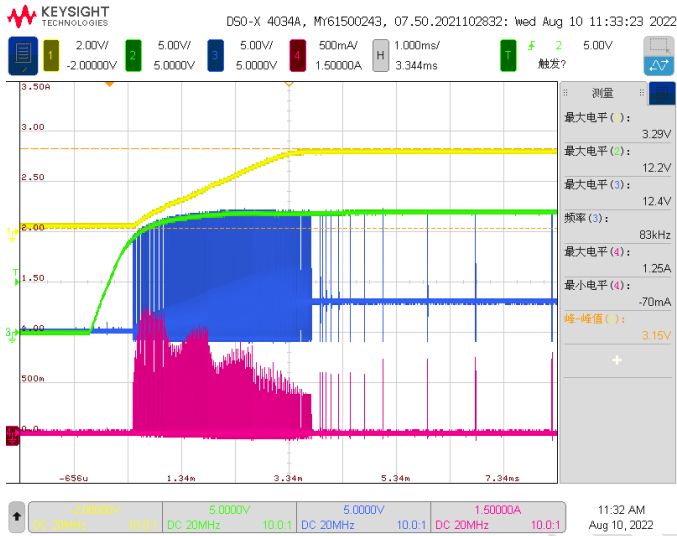
$I_O=3.5A$



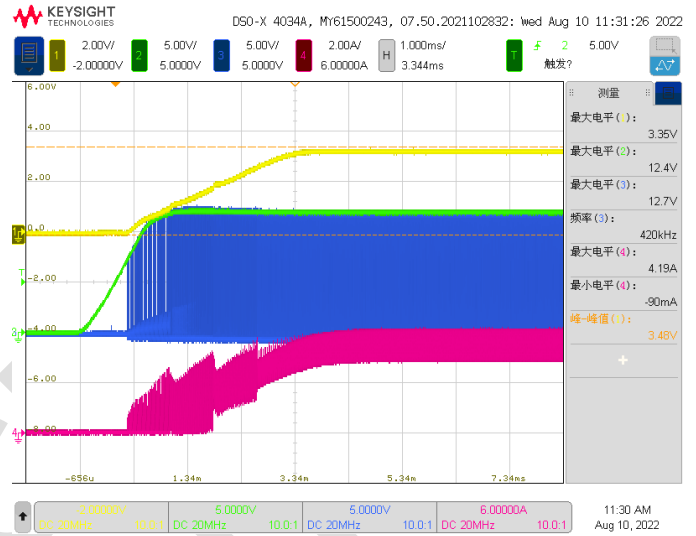
## 6. $V_{IN}$ on/off

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

$I_O=0A$

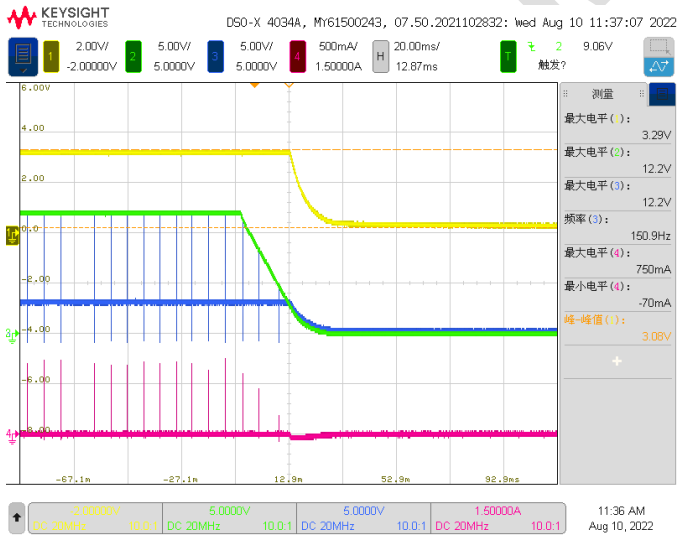


$I_O=3.5A$

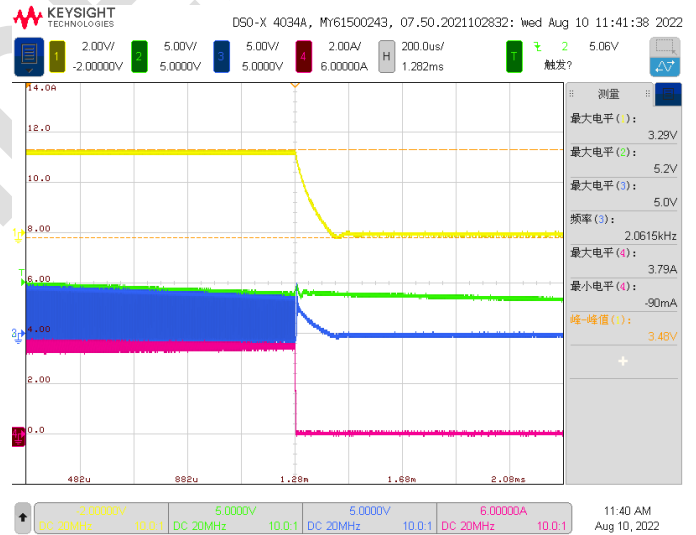


Test condition:  $V_{IN}=12V$ ,  $V_{OUT}=3.3V$ ,  $V_{IN}$  power off.

$I_O=0A$



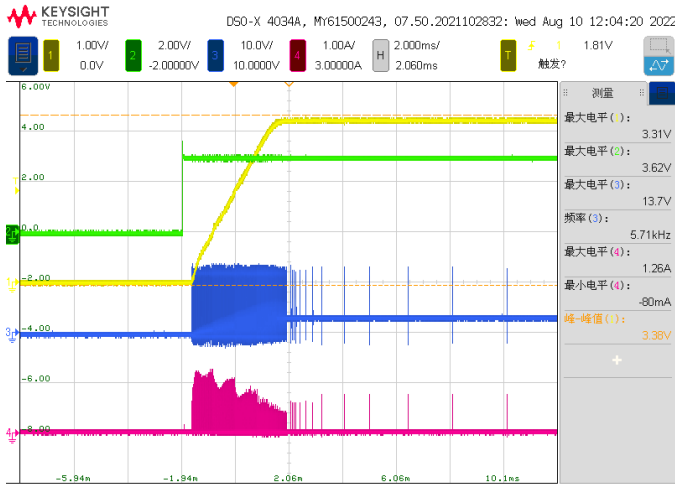
$I_O=3.5A$



## 7. EN on/off

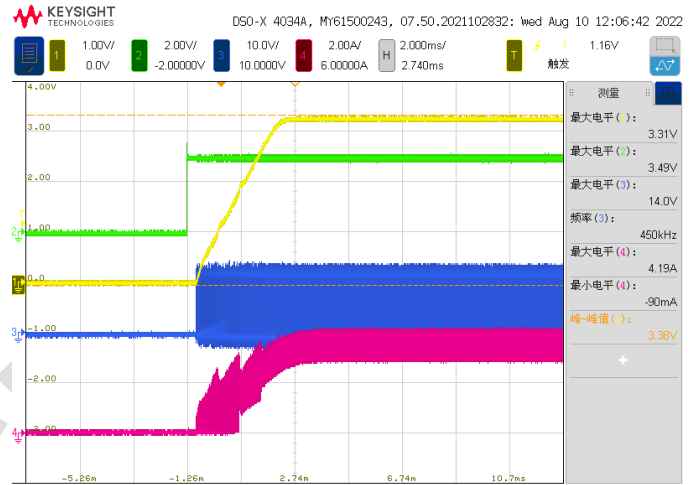
Test condition:  $V_{IN}=12V$ ,  $V_{OUT}=3.3V$ , EN on.

$I_O=0A$



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

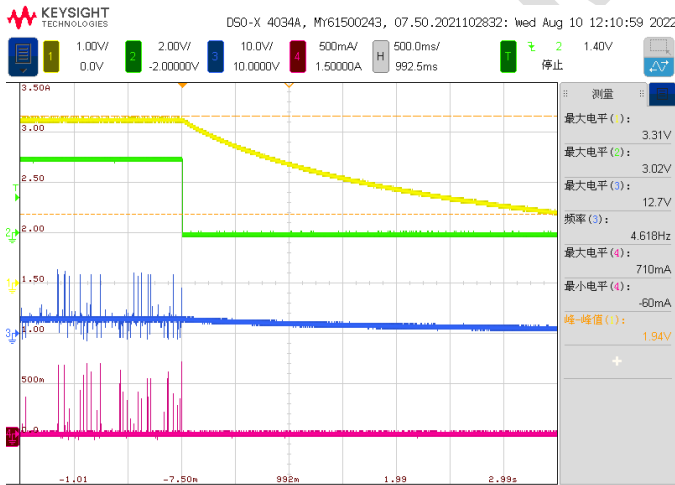
$I_O=3.5A$



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

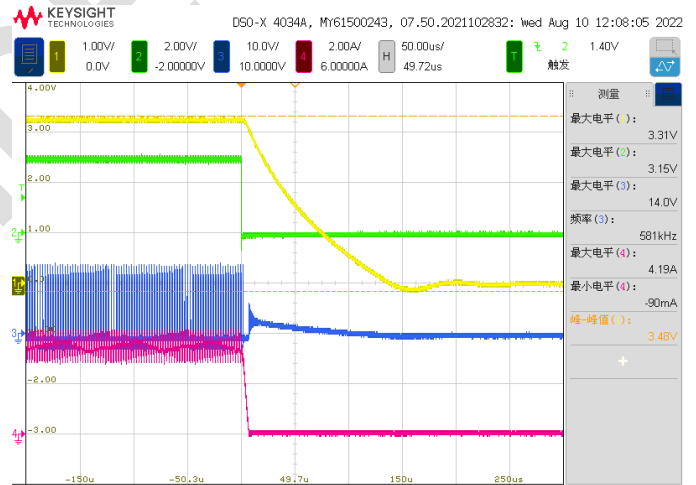
Test condition:  $V_{IN}=12V$ ,  $V_{OUT}=3.3V$ , EN off.

$I_O=0A$



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

$I_O=3.5A$



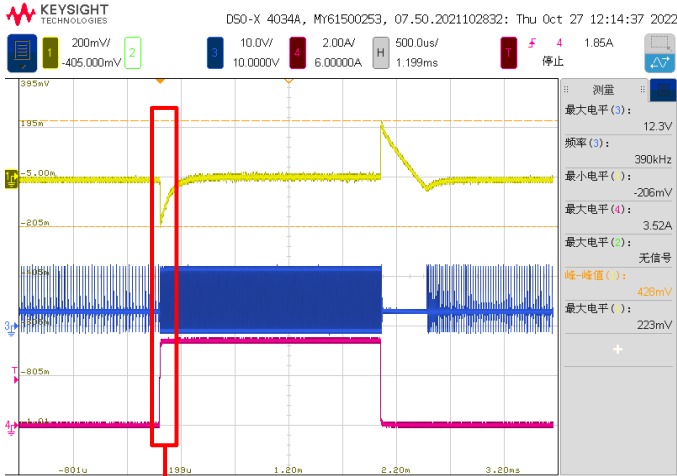
Ch1- $V_{OUT}$ , Ch2- $V_{EN}$ , Ch3- $V_{SW}$ , Ch4- $I_L$

## 8. Load Transient

Test condition:  $V_{IN}=12V$ ,  $V_{OUT}=3.3V$ ,  $C_{OUT}=2 \times 47\mu F/25V/1206$ , E-load slew rate is 2.5A/us.

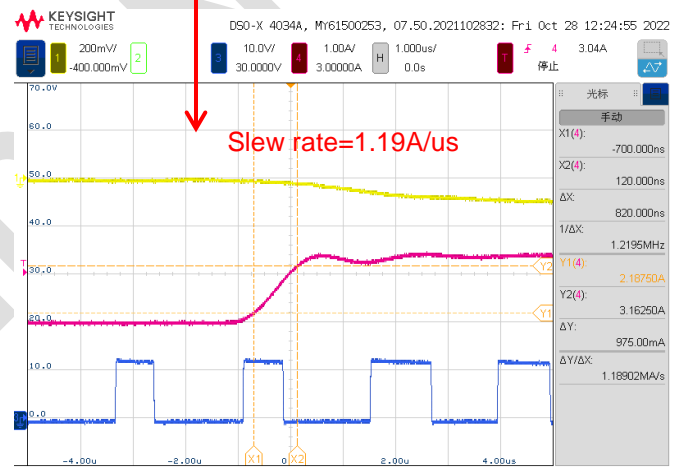
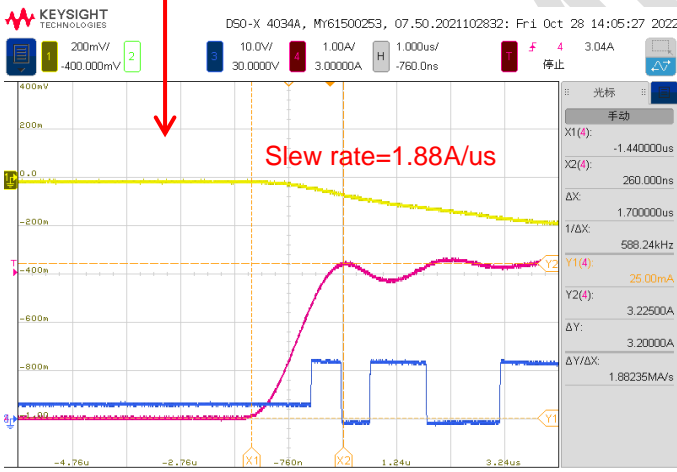
$I_O=0A-3.5A-0A$

$I_O=2A-3.5A-2A$



Ch1-V<sub>OUT/AC</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>OUT</sub>

Ch1-V<sub>OUT/AC</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>OUT</sub>



Ch1-V<sub>OUT/AC</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>OUT</sub>

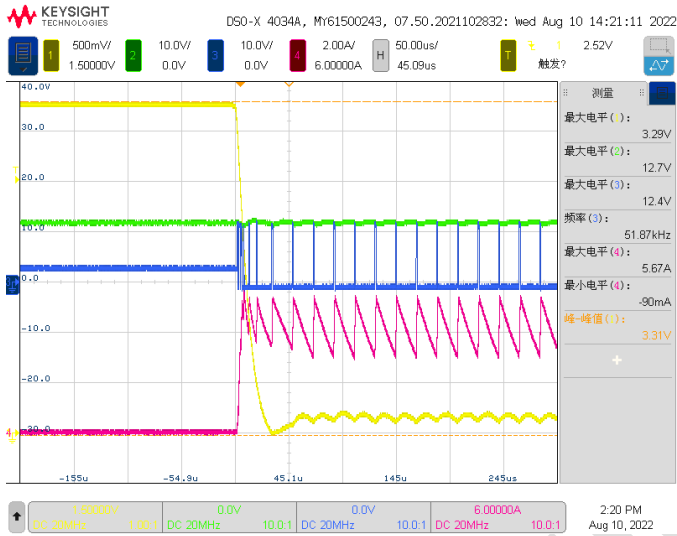
Ch1-V<sub>OUT/AC</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>OUT</sub>



## 9. SCP Entry/Recovery

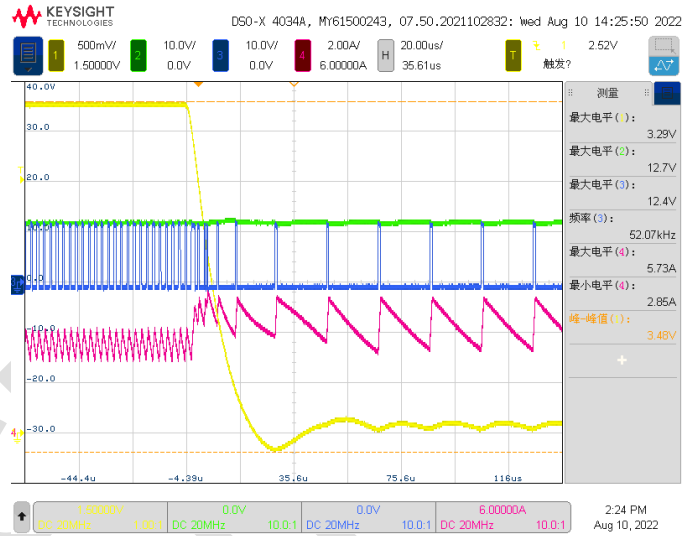
Test condition:  $V_{IN}=12V$ ,  $V_{OUT}=3.3V$ , short  $V_O$  to GND, SCP entry.

$I_O=0A$



Ch1-V<sub>OUT</sub>, Ch2-V<sub>IN</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub>

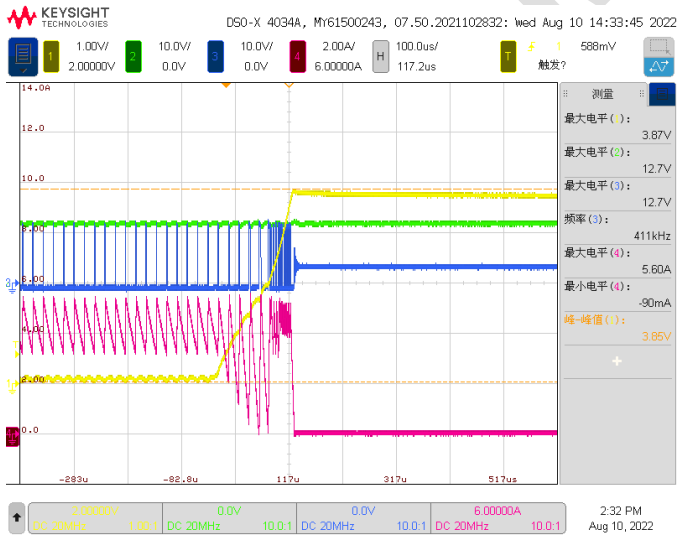
$I_O=3.5A$



Ch1-V<sub>OUT</sub>, Ch2-V<sub>IN</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub>

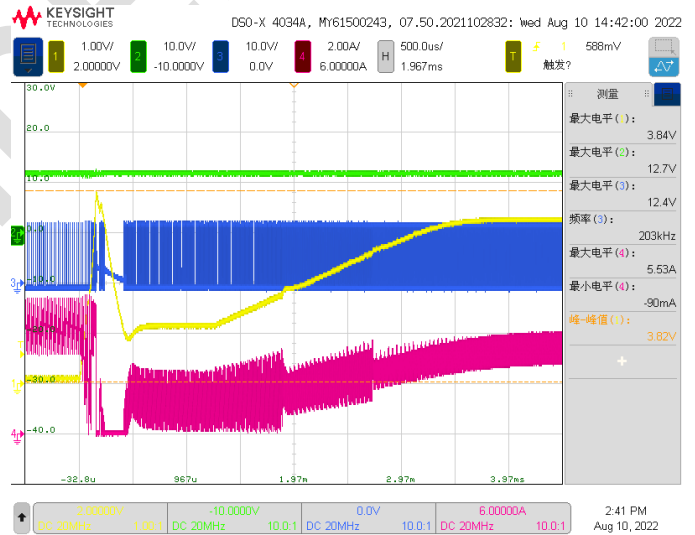
Test condition:  $V_{IN}=12V$ ,  $V_O=3.3V$ , short  $V_O$  to GND, SCP recovery.

$I_O=0A$



Ch1-V<sub>OUT</sub>, Ch2-V<sub>IN</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub>

$I_O=3.5A$

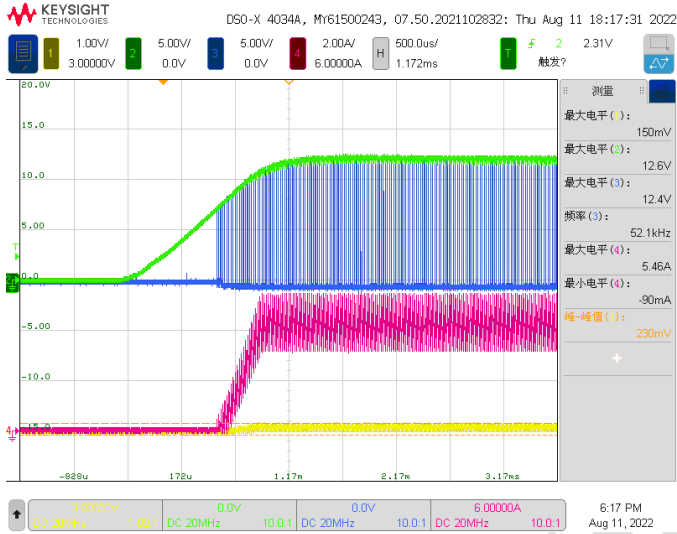


Ch1-V<sub>OUT</sub>, Ch2-V<sub>IN</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub>

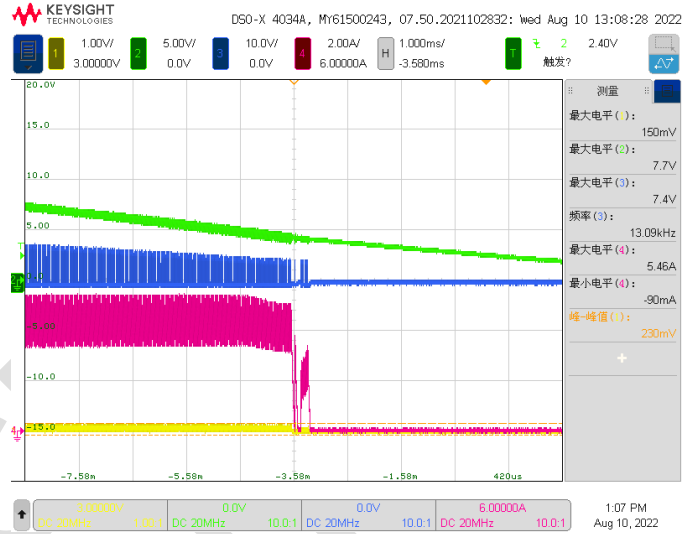
## 10. SCP power/EN on/off

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

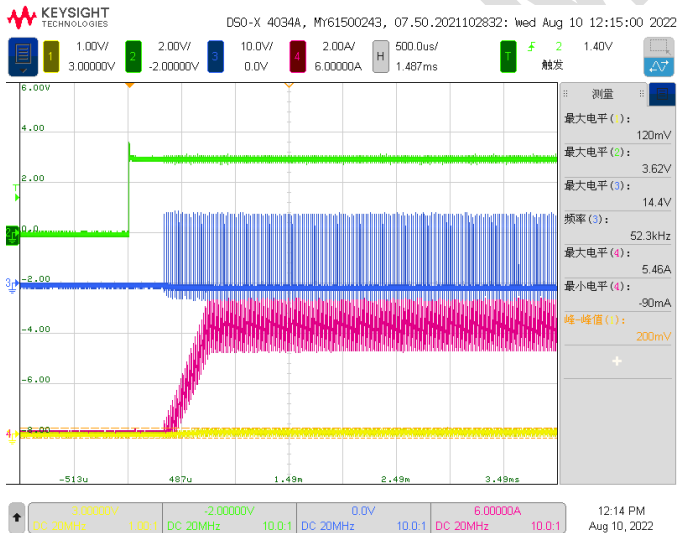
Power on



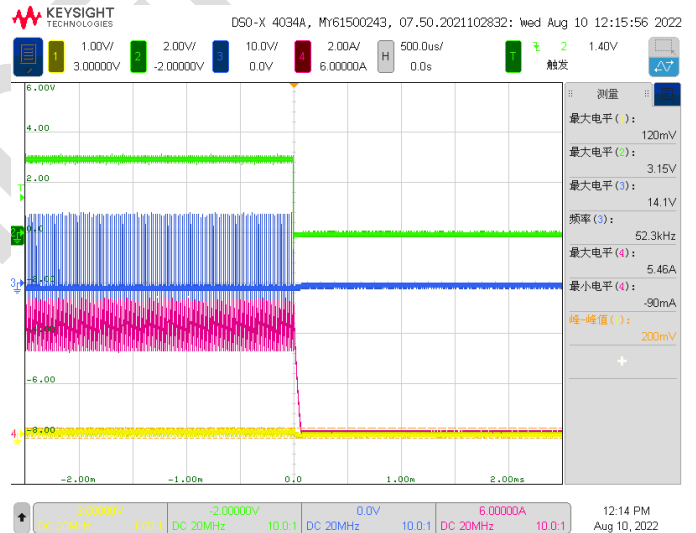
Power off



EN on



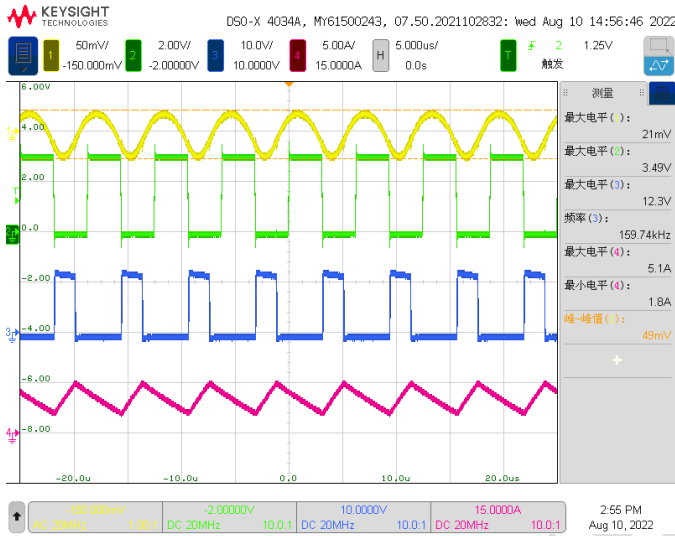
EN off



## 11. Synchronize to External Clock

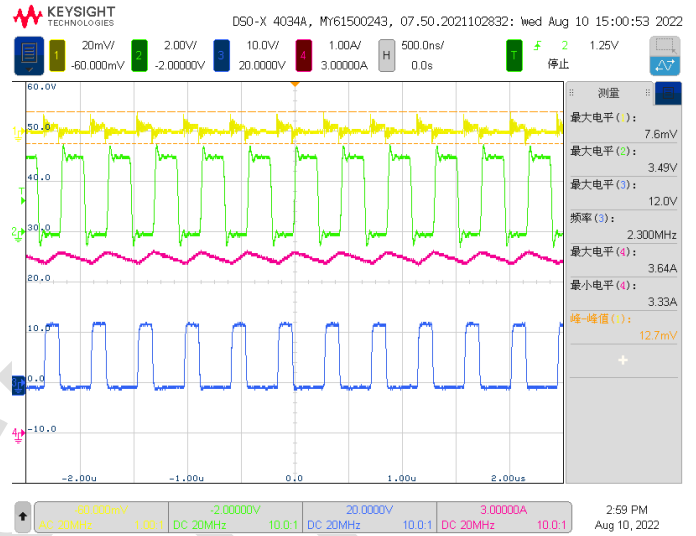
Test condition:  $V_{IN}=12V$ ,  $V_{OUT}=3.3V/3.5A$ . External SYNC signal amplitude is 3V.

$f_{SYNC}=160kHz$



Ch1-V<sub>OUT/AC</sub>, Ch2-V<sub>SYNC</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub>

$f_{SYNC}=2.3MHz$



Ch1-V<sub>OUT/AC</sub>, Ch2-V<sub>SYNC</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub>

## 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  $I_o=3.5A$ .

