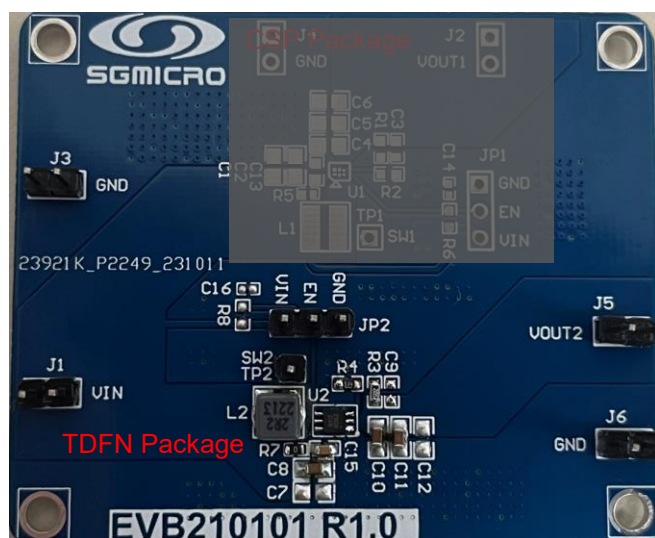


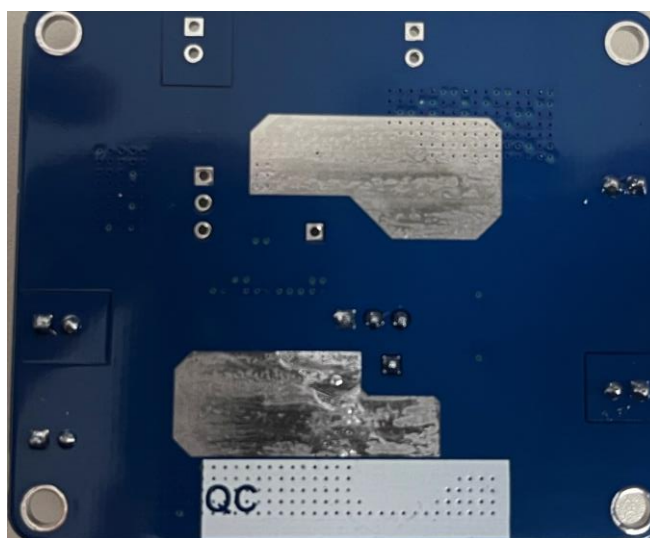
## **SGM66099A Demo Board Test Report**

**Synchronous Boost Converter with Ultra-Low Quiescent Current with 0.7V to  
5.5V Input, 5V Output**

### **Demo Board Pictures:**



**Top Layer**



**Bottom Layer**

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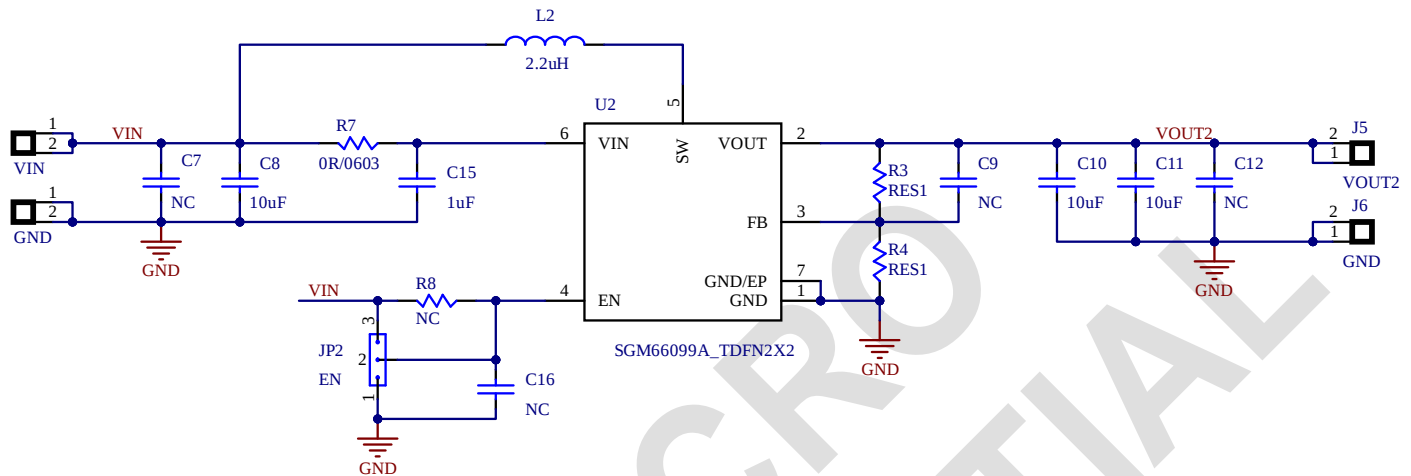
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# SGM66099A

# Demo Board Test Report

## 1. Schematic, BOM List and PCB Layout

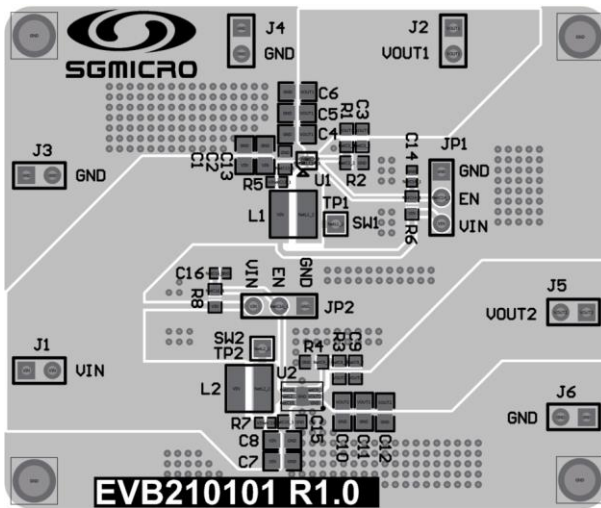
### 1.1 Schematic



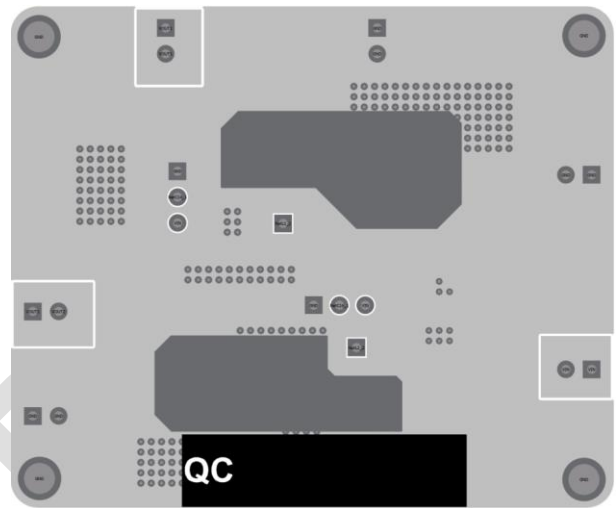
## 1.2 BOM List

| Item                           | Quantity | Designator       | Description                                                  | Manufactory                 |
|--------------------------------|----------|------------------|--------------------------------------------------------------|-----------------------------|
| 1                              | 0        | C7, C9, C12, C16 | NC                                                           |                             |
| 2                              | 3        | C8, C10, C11     | Ceramic capacitor, 10μF, 25V, ±20%, X5R, 0603                | Murata<br>GRM188R61E106MA73 |
| 3                              | 1        | C15              | Ceramic capacitor, 1μF, 16V, ±10%, X7R, 0603                 | Murata<br>GCM188R71C105KA64 |
| 4                              | 1        | L2               | 2.2uH, 3.25A, DCR=61mΩ                                       | WURTH 74437324022           |
| 5                              | 1        | R3               | Chip Thick Film Resistor, 2MΩ, 1%, 0603                      |                             |
| 6                              | 1        | R4               | Chip Thick Film Resistor, 510kΩ, 1%, 0603                    |                             |
| 7                              | 1        | R7               | Chip Thick Film Resistor, 0Ω, 1%, 0603                       |                             |
| 8                              | 0        | R8               | NC                                                           |                             |
| 9                              | 1        | U2               | Synchronous Boost Converter with Ultra-Low Quiescent Current | SG-Micro<br>SGM66099A-TDFN  |
| Conclusion: Total 9 Components |          |                  |                                                              |                             |

## 1.3 PCB Layout



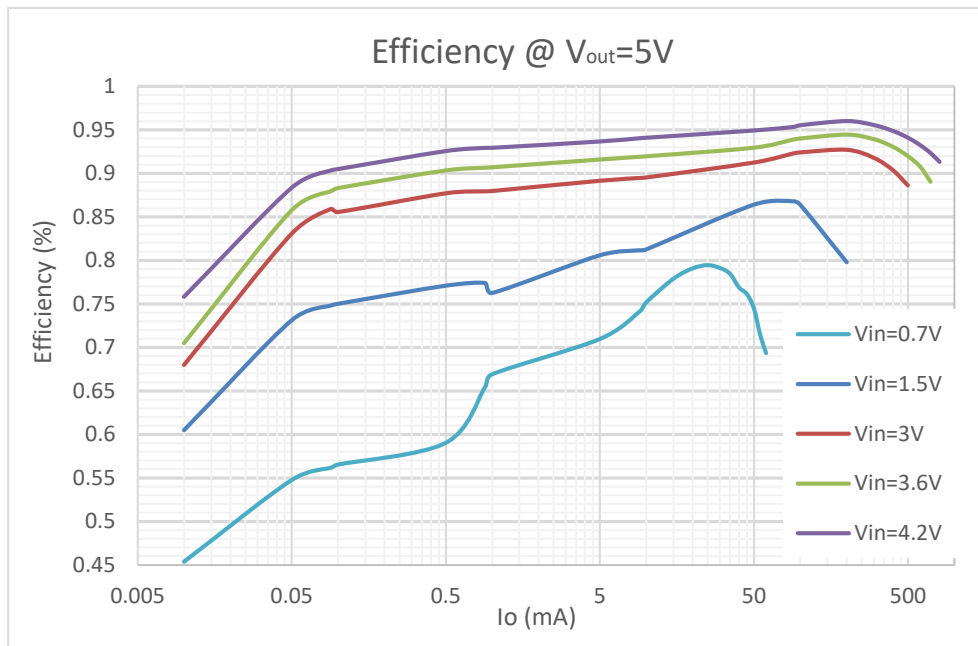
Top Layer



Bottom Layer

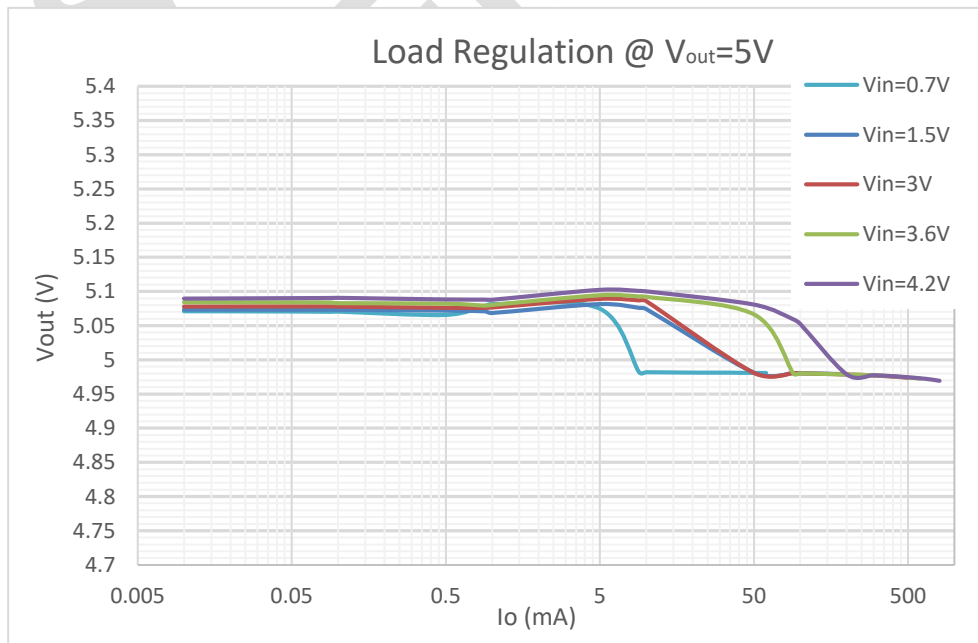
## 2. Efficiency

Test conditions:  $V_{IN}=0.7V/1.5V/3V/3.6V/4.2V$ ,  $V_{OUT}=5V$ ,  $I_{OUT}=10\mu A$  to  $800mA$ , measure the efficiency.



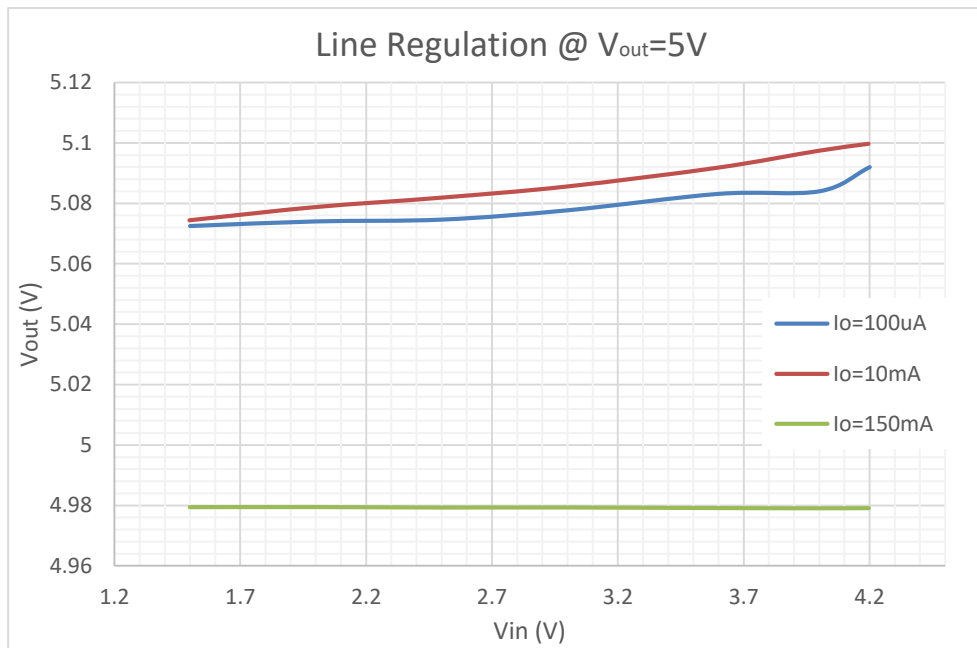
## 3. Load Regulation

Test conditions:  $V_{IN}=0.7V/1.5V/3V/3.6V/4.2V$ ,  $V_{OUT}=5V$ ,  $I_{OUT}=10\mu A$  to  $800mA$ , measure the load regulation.



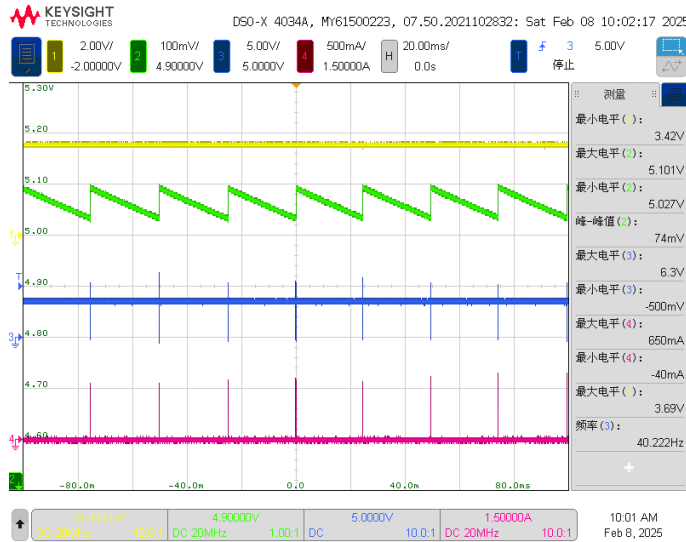
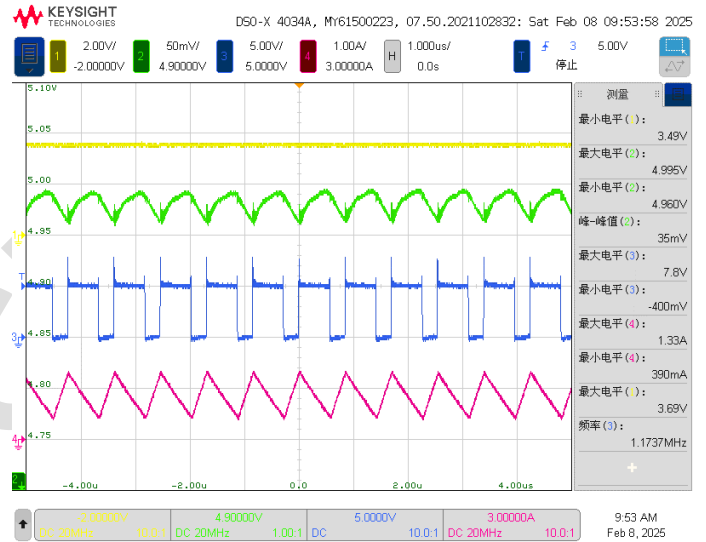
#### 4. Line Regulation

Test conditions:  $V_{IN}=1.5V/2V/2.5V/3V/3.6V/4V/4.2V$ ,  $V_{OUT}=5V$ ,  $I_{OUT}=100\mu A/10mA/150mA$ , measure the line regulation.

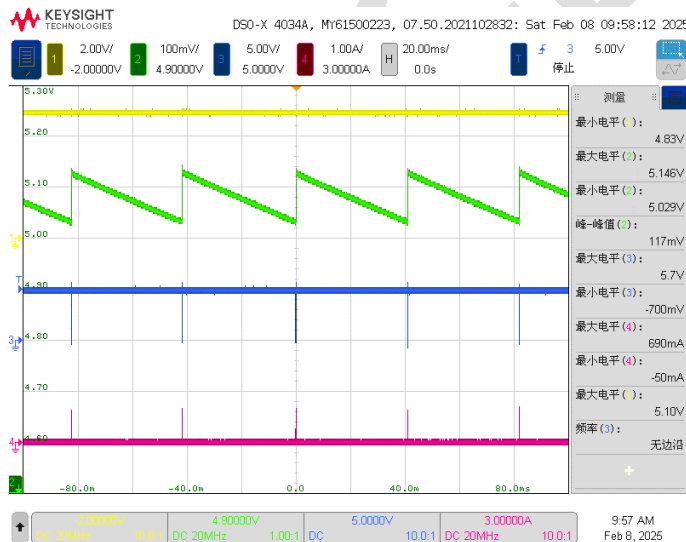
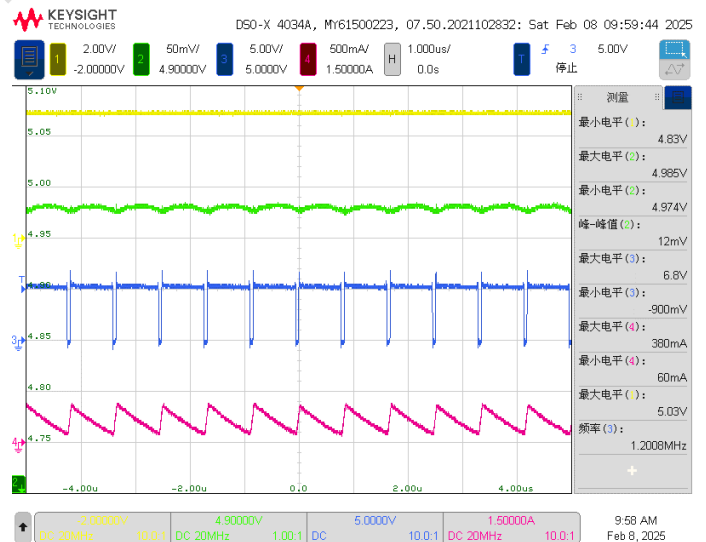


## 5. Output Voltage Ripple

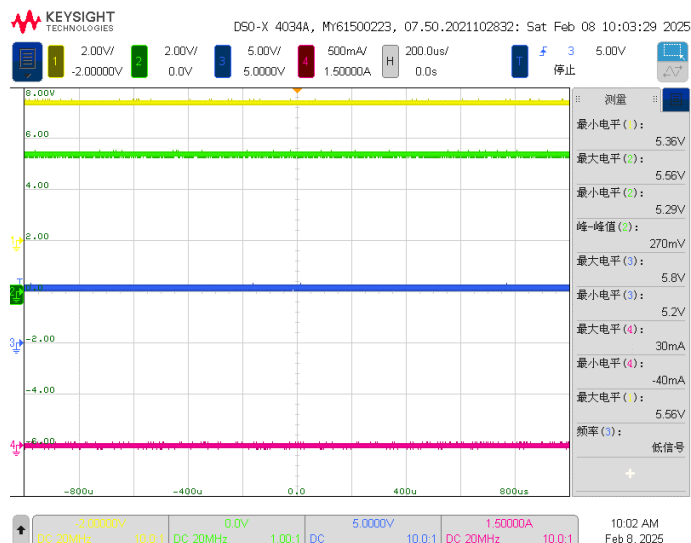
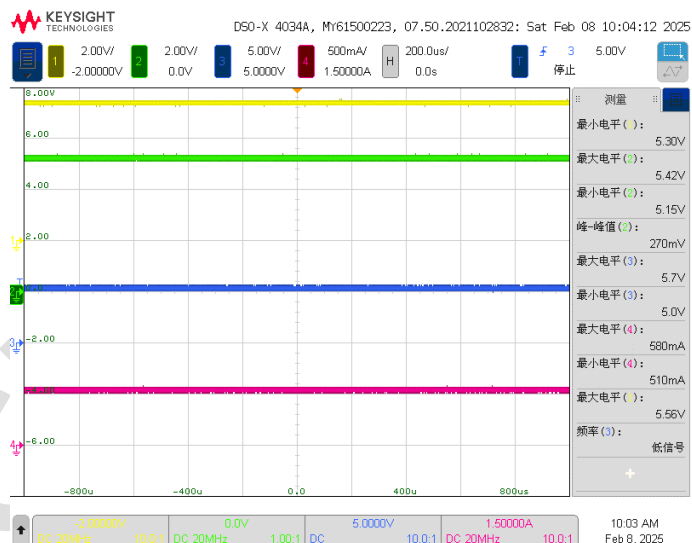
## 5.1 Boost Mode

Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ . $I_{OUT}=0A$  $I_{OUT}=0.55A$ 

## 5.2 Down Mode

Test conditions:  $V_{IN}=5V$ ,  $V_{OUT}=5V$ . $I_{OUT}=0A$  $I_{OUT}=0.2A$ 

## 5.3 Pass Through Mode

Test conditions:  $V_{IN}=5.5V$ ,  $V_{OUT}=5V$ . $I_{OUT}=0A$  $I_{OUT}=0.55A$ Ch1- $V_{IN}$ , Ch2- $V_{OUT}$ , Ch3- $V_{SW}$ , Ch4- $I_L$ Ch1- $V_{IN}$ , Ch2- $V_{OUT}$ , Ch3- $V_{SW}$ , Ch4- $I_L$

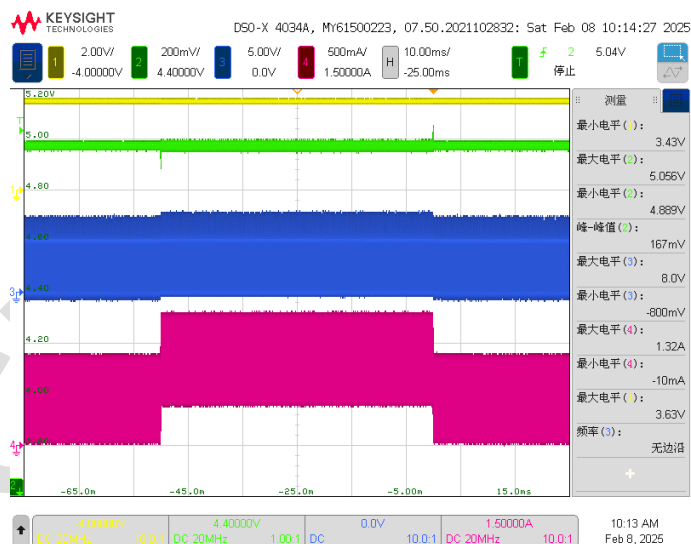
## 6. Load Transient

Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ , CCDH E-load slew rate is  $10mA/\mu s$ .

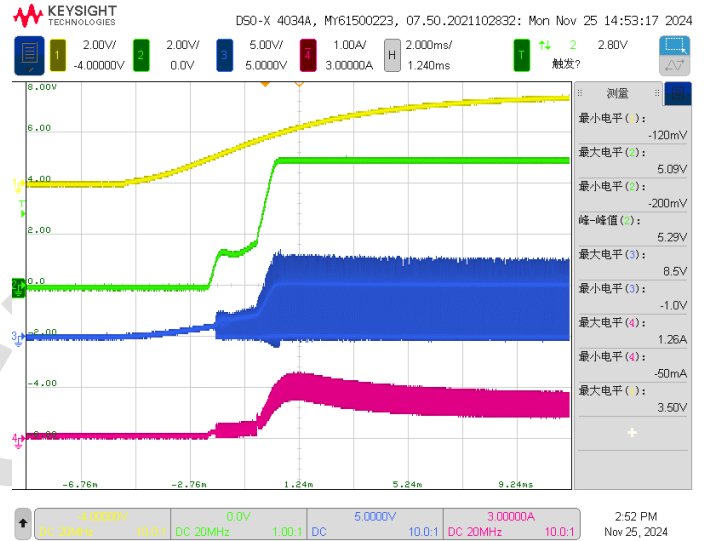
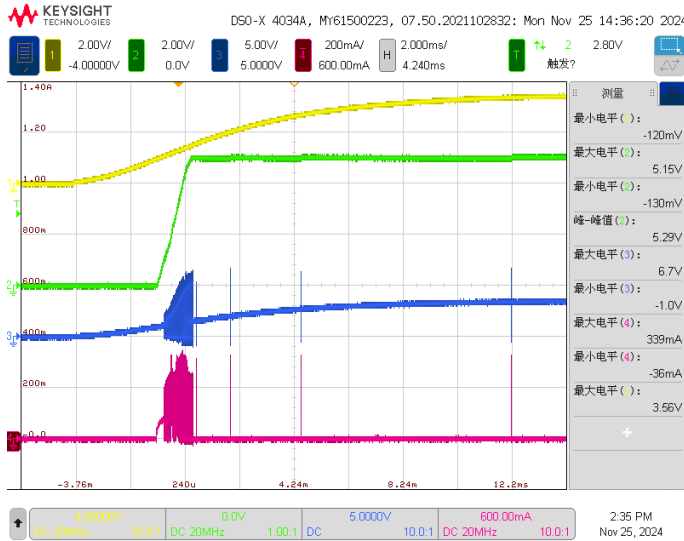
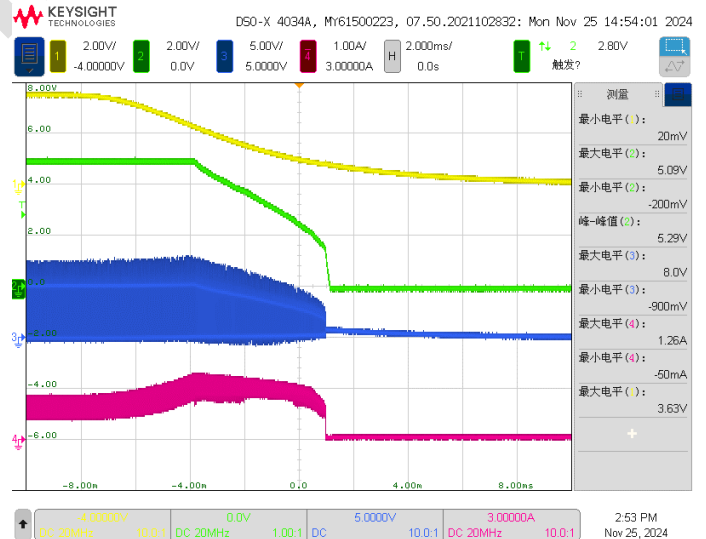
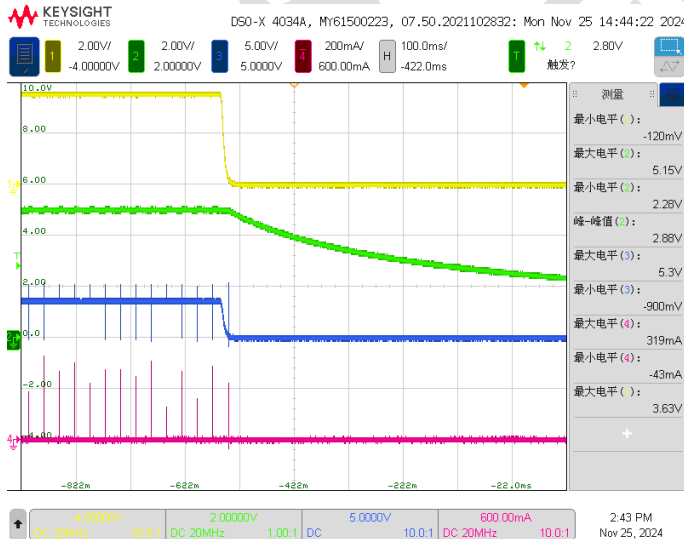
$I_{OUT}=0.1A$  to  $0.55A$  to  $0.1A$



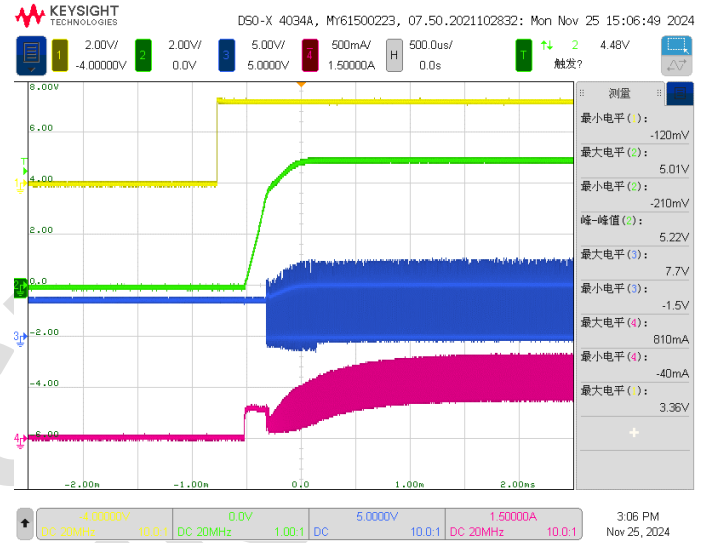
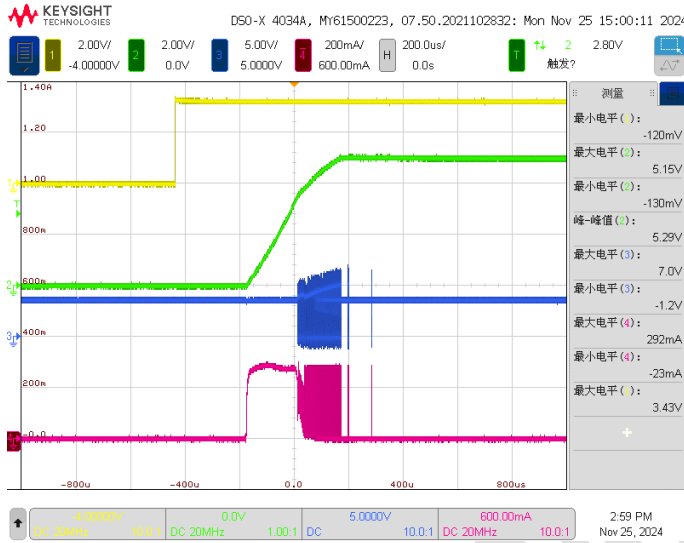
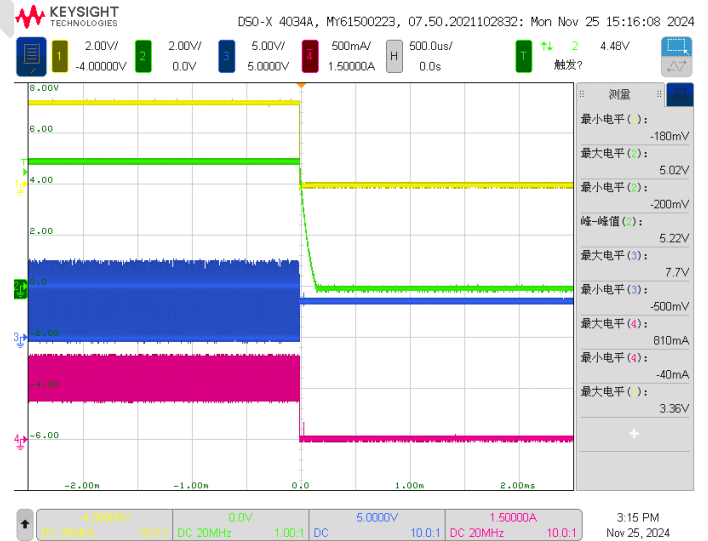
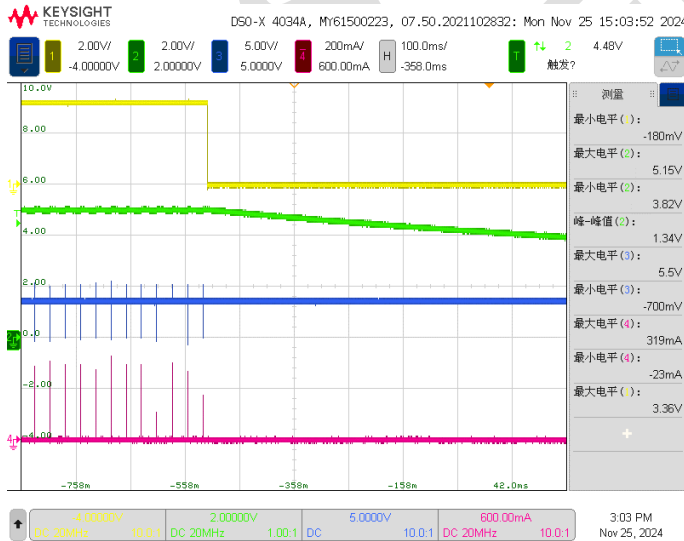
$I_{OUT}=0.3A$  to  $0.55A$  to  $0.3A$



## 7. VIN Power On/Off

Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ , VIN power on. $I_{OUT}=0A$  $R_{LOAD}=12.5\Omega$ Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ , VIN power off. $I_{OUT}=0A$  $R_{LOAD}=12.5\Omega$ 

## 8. EN On/Off

Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ , EN on. $I_{OUT}=0A$  $R_{LOAD}=12.5\Omega$ Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ , EN off. $I_{OUT}=0A$  $R_{LOAD}=12.5\Omega$ 

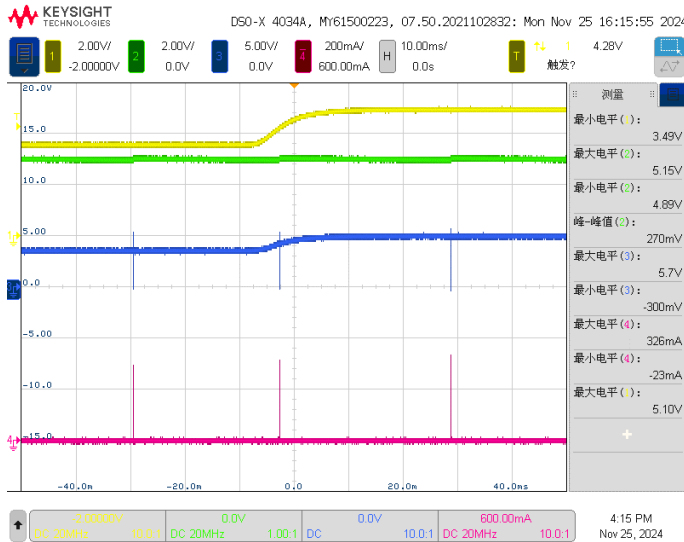
## 9. Mode Transient

Test conditions:  $V_{OUT}=5V$ , change mode by  $V_{IN}$  and measure the mode transient.

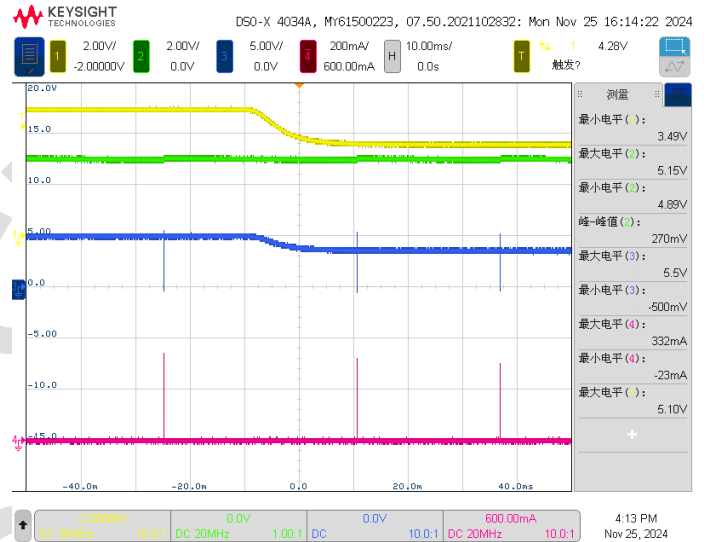
## 9.1 Boost Mode to Down Mode to Boost Mode

Test conditions:  $V_{IN}=3.6V-5V-3.6V$ ,  $V_{OUT}=5V$ .

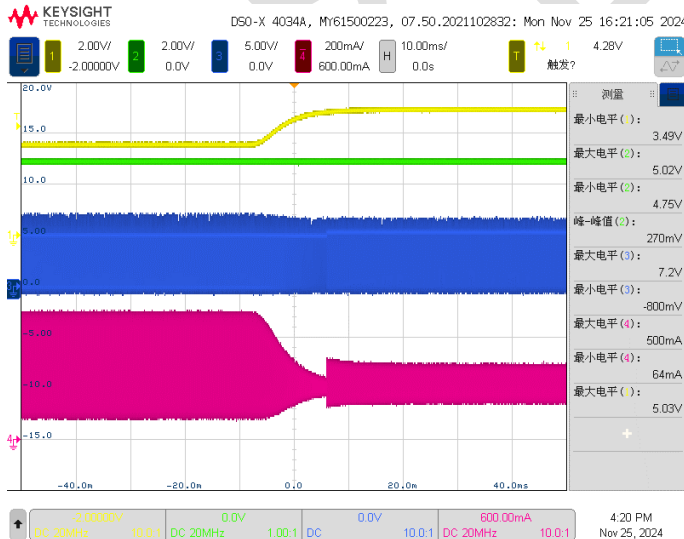
$V_{IN}=3.6V-5V$   $I_{OUT}=0A$



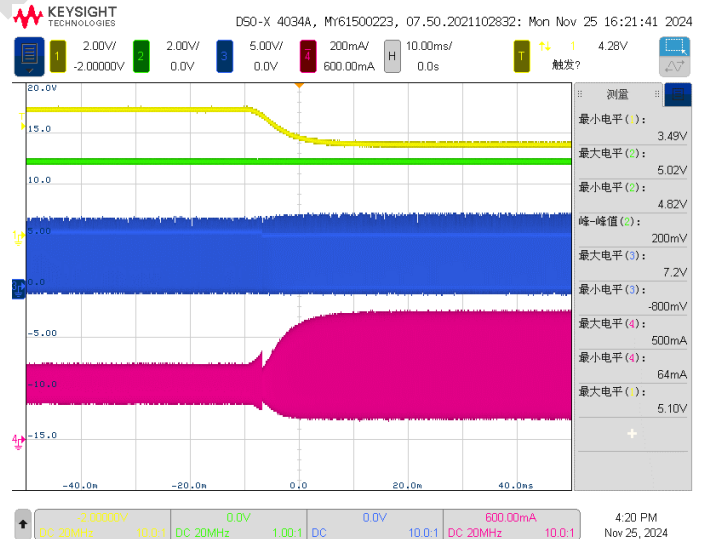
$V_{IN}=5V-3.6V$   $I_{OUT}=0A$



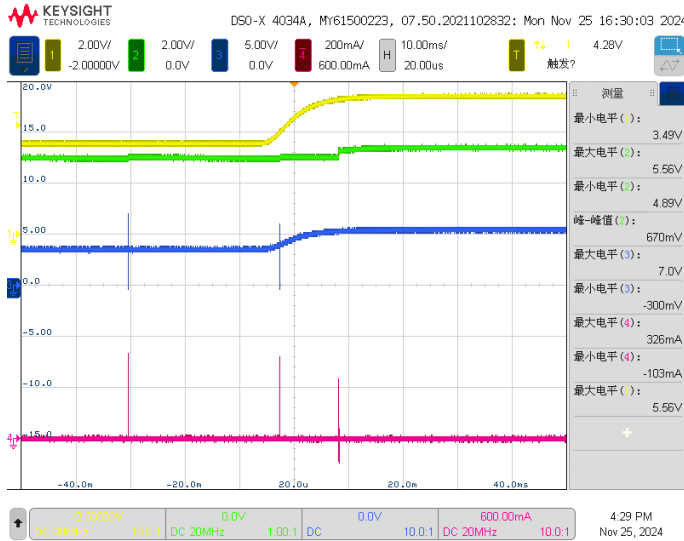
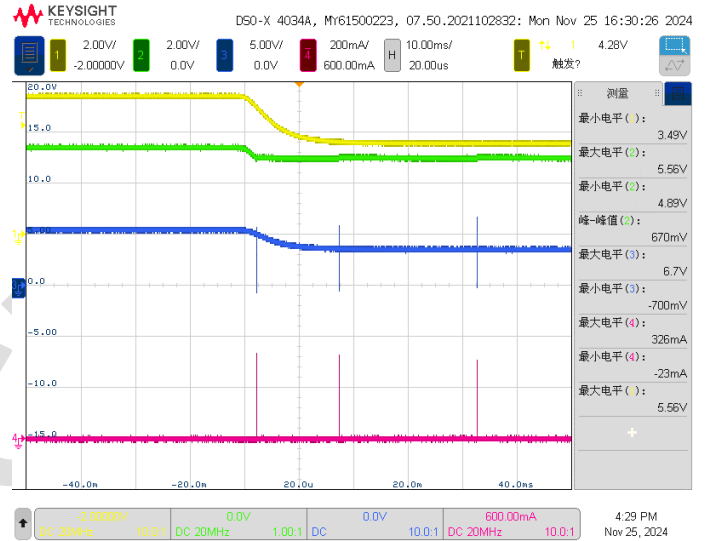
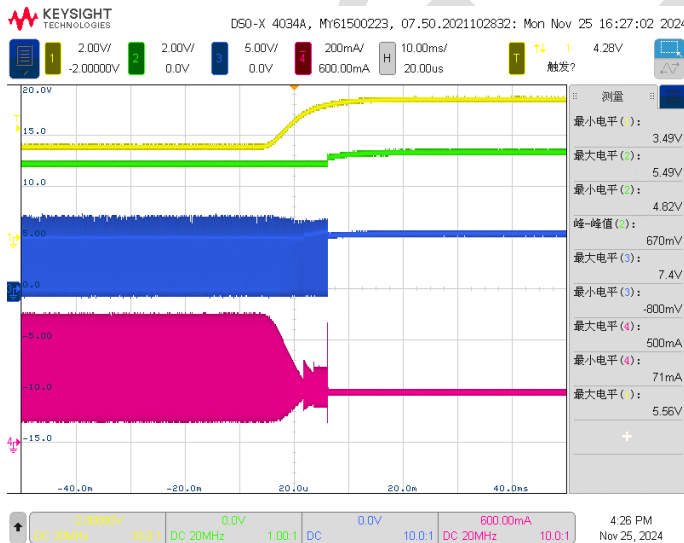
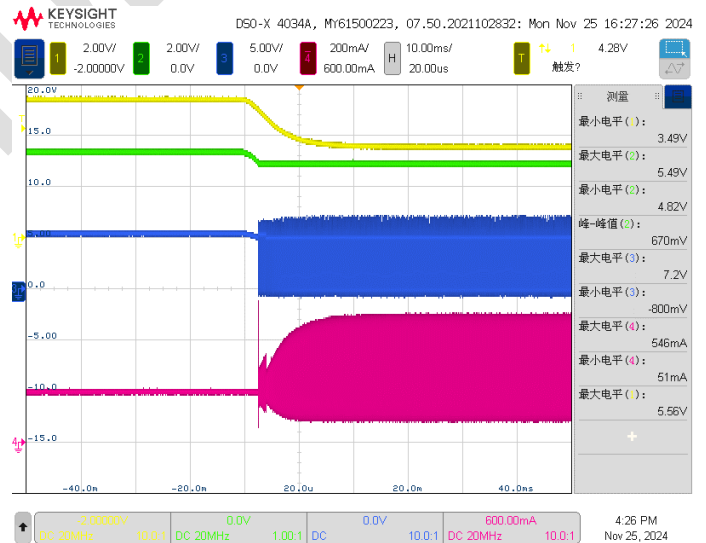
$V_{IN}=3.6V-5V$   $I_{OUT}=0.2A$



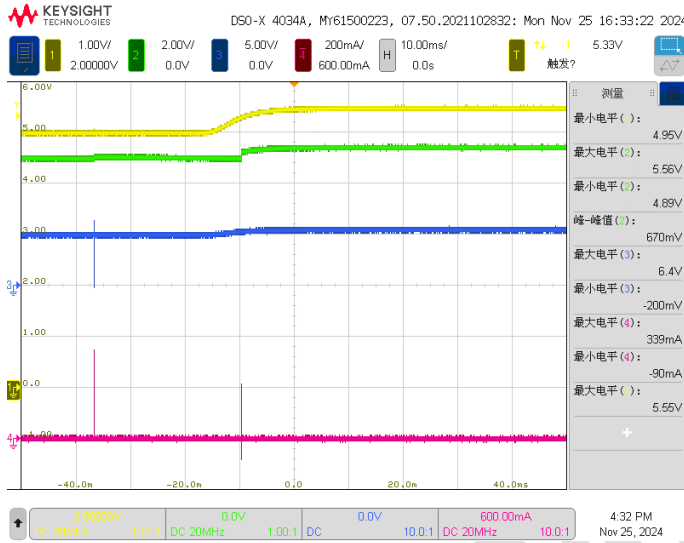
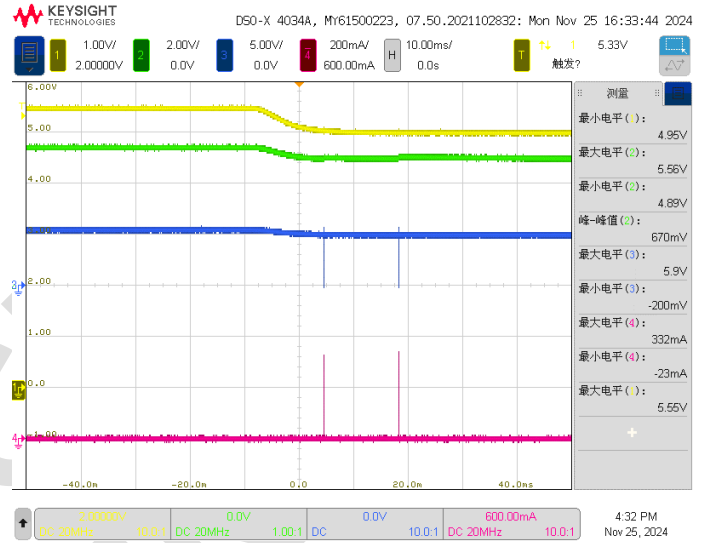
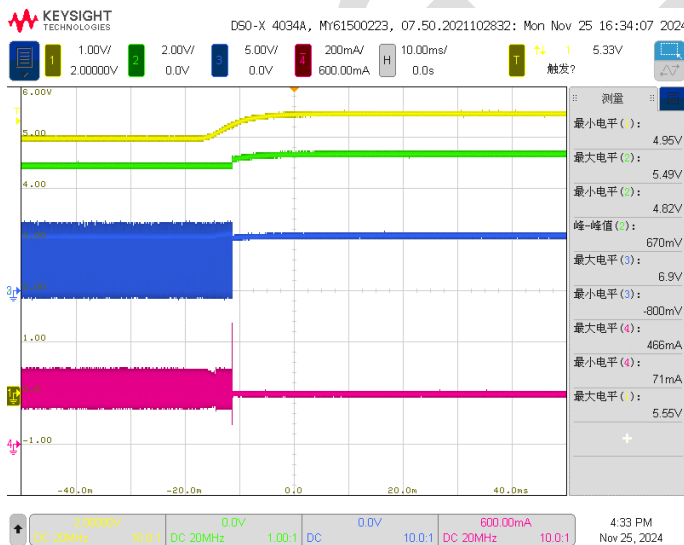
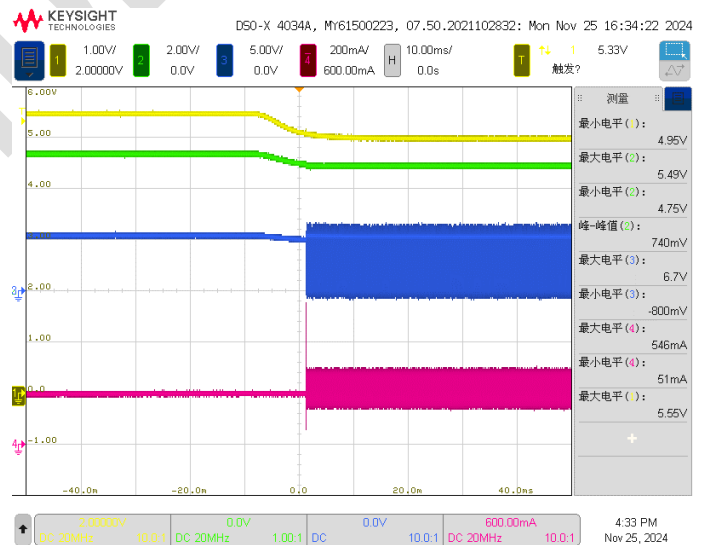
$V_{IN}=5V-3.6V$   $I_{OUT}=0.2A$



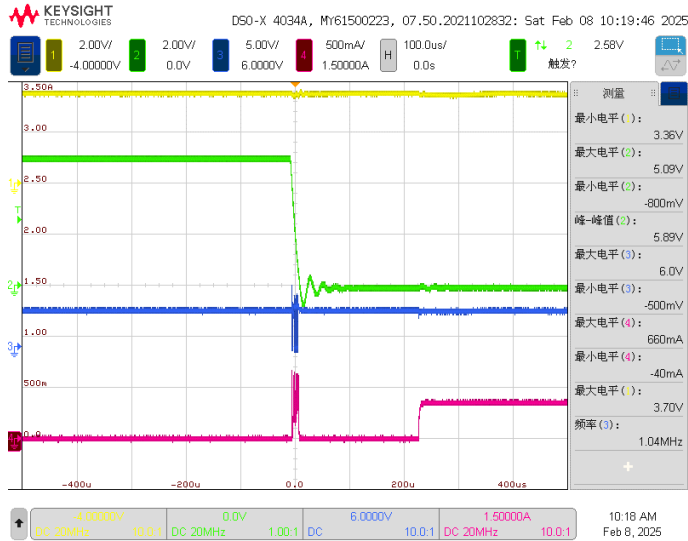
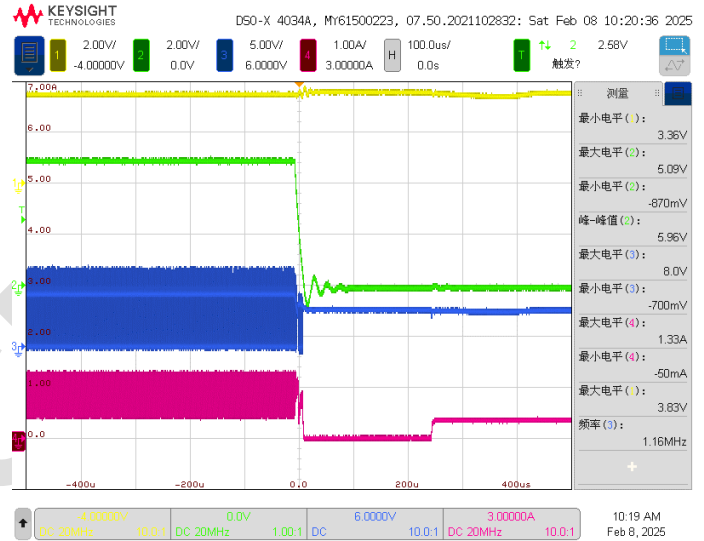
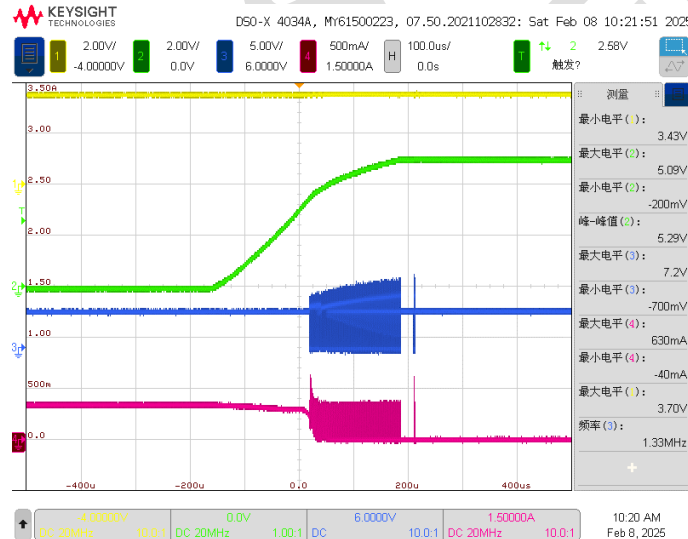
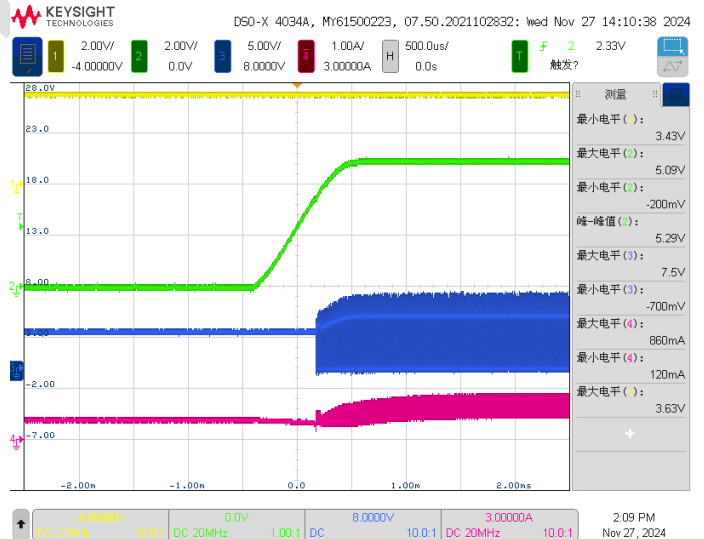
## 9.2 Boost Mode to Pass Through Mode to Boost Mode

Test conditions:  $V_{IN}=3.6V-5.5V-3.6V$ ,  $V_{OUT}=5V$ . $V_{IN}=3.6V-5.5V$   $I_{OUT}=0A$  $V_{IN}=5.5V-3.6V$   $I_{OUT}=0A$  $V_{IN}=3.6V-5.5V$   $I_{OUT}=0.2A$  $V_{IN}=5.5V-3.6V$   $I_{OUT}=0.2A$ 

## 9.3 Down Mode to Pass Through Mode to Down Mode

Test conditions:  $V_{IN}=5V-5.5V-5V$ ,  $V_{OUT}=5V$ . $V_{IN}=5V-5.5V$   $I_{OUT}=0A$ Ch1-V<sub>IN</sub>, Ch2-V<sub>OUT</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub> $V_{IN}=5.5V-5V$   $I_{OUT}=0A$ Ch1-V<sub>IN</sub>, Ch2-V<sub>OUT</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub> $V_{IN}=5V-5.5V$   $I_{OUT}=0.2A$ Ch1-V<sub>IN</sub>, Ch2-V<sub>OUT</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub> $V_{IN}=5.5V-5V$   $I_{OUT}=0.2A$ Ch1-V<sub>IN</sub>, Ch2-V<sub>OUT</sub>, Ch3-V<sub>SW</sub>, Ch4-I<sub>L</sub>

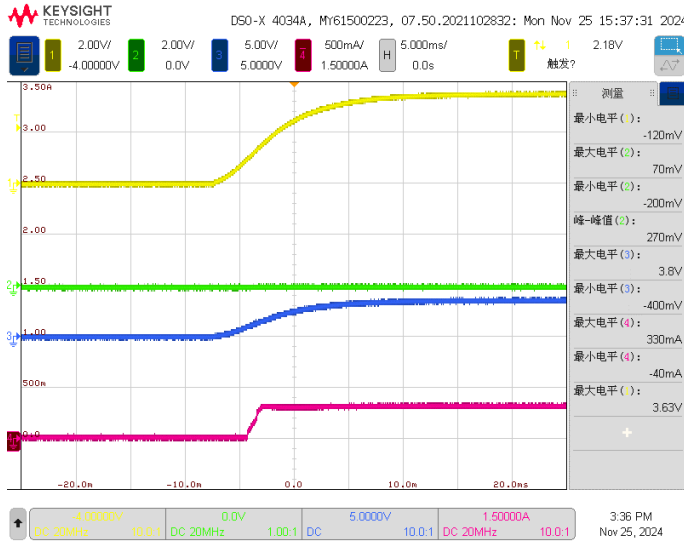
## 10. SCP Entry and Recovery

Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ , short  $V_{OUT}$  to GND. $I_{OUT}=0A$  $I_{OUT}=0.55A$ Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ , release  $V_{OUT}$  from shorting to GND. $I_{OUT}=0A$  $R_{LOAD}=12.5ohm$ 

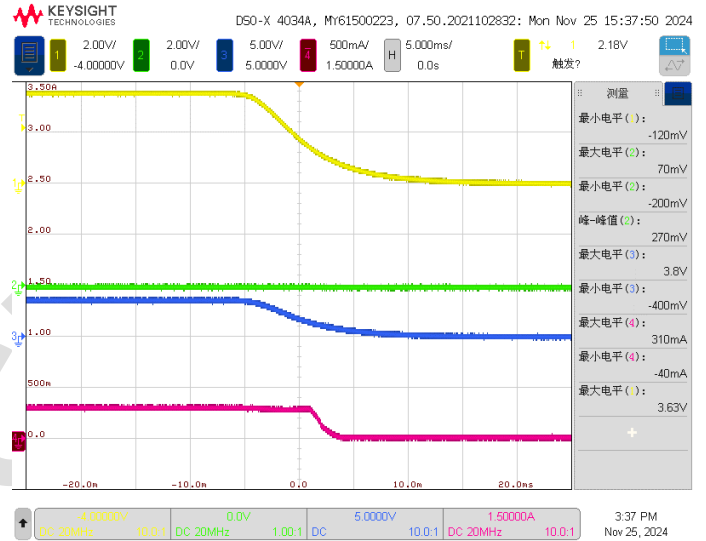
## 11. VIN/EN On/Off during SCP

Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ , short  $V_{OUT}$  to GND.

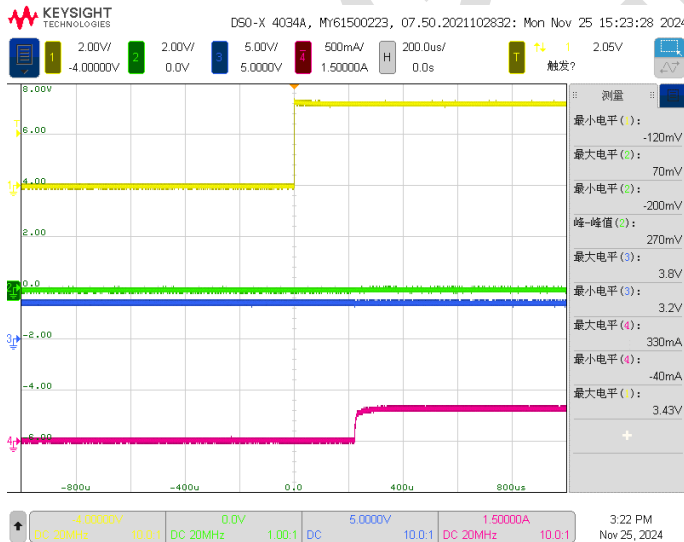
VIN Power On



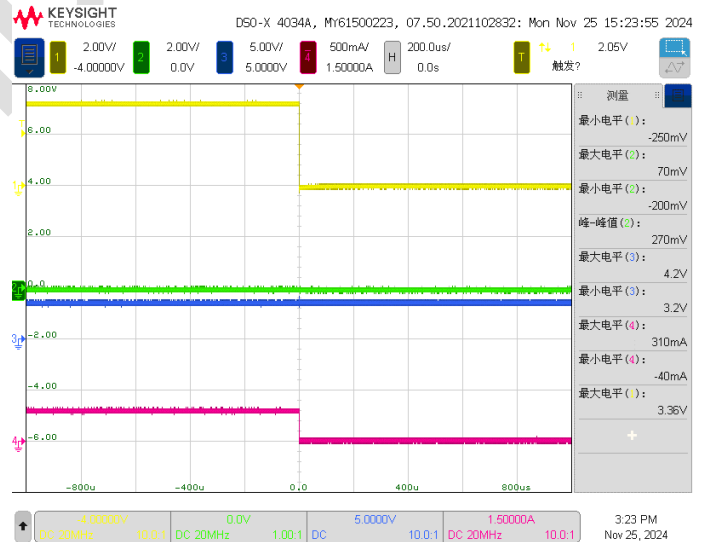
VIN Power Off



EN On



EN Off



## 12. Thermal Test

Test conditions:  $V_{IN}=3.6V$ ,  $V_{OUT}=5V$ ,  $I_{OUT}=0.1A$  to  $0.7A$ , measure IC case temperature ( $T_C$ ) rise at room temperature.

