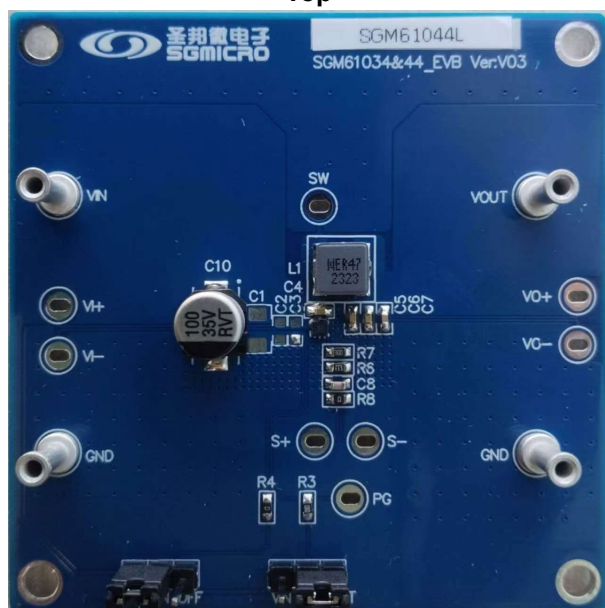


## SGM61044L Demo Board Test Report

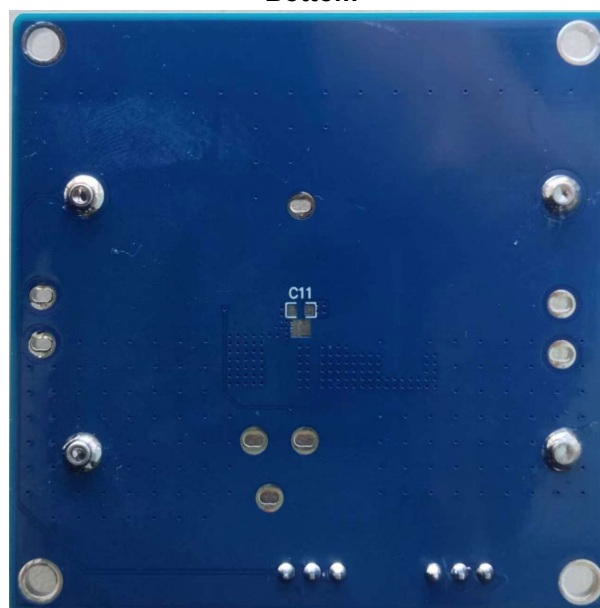
2.4V to 5.5V Input (3.3V TYP), 0.75V/4A Output

### Demo Board Pictures:

Top



Bottom

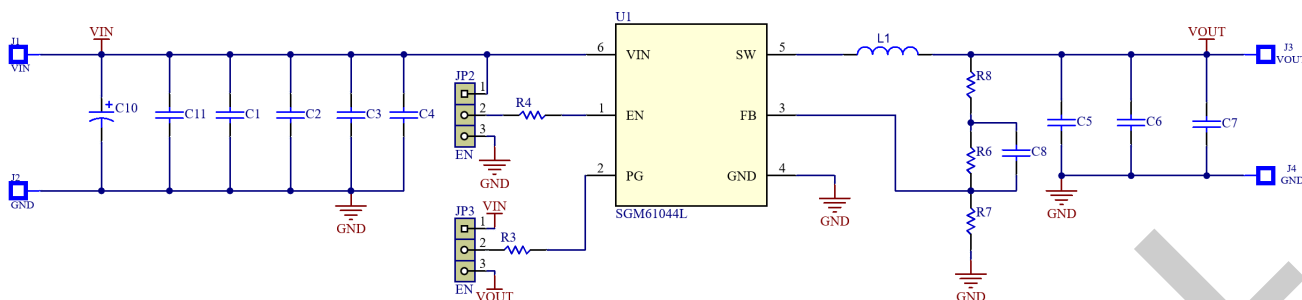


## Table of Contents

|                                             |    |
|---------------------------------------------|----|
| Table of Contents .....                     | 2  |
| 1. Schematic, BOM List and PCB Layout ..... | 3  |
| 1.1 Schematic .....                         | 3  |
| 1.2 BOM List .....                          | 3  |
| 1.3 PCB Layout .....                        | 4  |
| 2. Bode Plot .....                          | 5  |
| 3. Efficiency .....                         | 5  |
| 4. Load Regulation .....                    | 6  |
| 5. Line Regulation .....                    | 6  |
| 6. Output Voltage Ripple .....              | 7  |
| 7. VIN Power On/Off .....                   | 7  |
| 8. EN On/Off .....                          | 8  |
| 9. Load Transient .....                     | 8  |
| 10. SCP Entry and Recovery .....            | 9  |
| 11. VIN/EN On/Off during SCP .....          | 9  |
| 12. Thermal Test .....                      | 10 |

## 1. Schematic, BOM List and PCB Layout

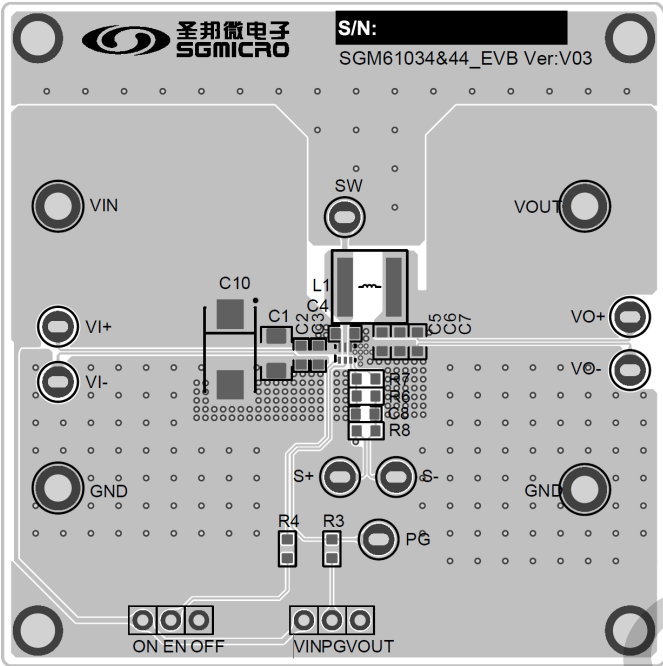
## 1.1 Schematic



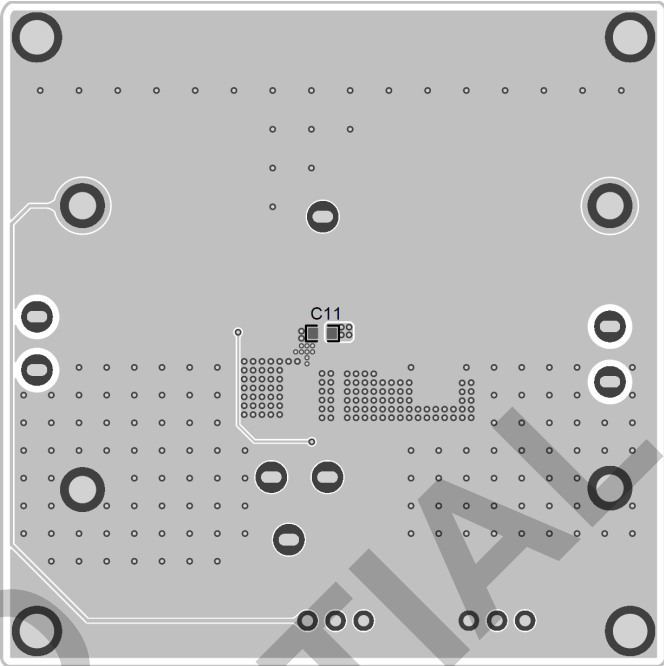
## 1.2 BOM List

| Item                            | Quantity | Designator   | Description                                                                                                               | Manufactory |
|---------------------------------|----------|--------------|---------------------------------------------------------------------------------------------------------------------------|-------------|
| 1                               | 0        | C1,C2,C3,C11 | NC                                                                                                                        |             |
| 2                               | 1        | C4           | 10μF, Ceramic capacitor, 10V, ±20%, X5R, 0402, GRM155R61A106ME11                                                          | muRata      |
| 3                               | 3        | C5,C6,C7     | 10μF, Ceramic capacitor, 6.3V, ±20%, X5R, 0402, GRM155R60J106ME18                                                         | muRata      |
| 4                               | 1        | C8           | 120pF, Ceramic capacitor, 50V, ±5%, C0G, 0603                                                                             | Standard    |
| 5                               | 1        | C10          | 100μF, Solid Electrolytic capacitor, 35V                                                                                  | Standard    |
| 6                               | 1        | L1           | 0.47μH, Wire Wound, DCR <sub>TYP</sub> =6.4mΩ, I <sub>SAT</sub> (30%)=21.5A, I <sub>RMS</sub> (+40°C)=12.3A, 744373360047 | Würth       |
| 7                               | 1        | R3           | 100kΩ, Chip Resistor, ±1%, Size 0603                                                                                      | Standard    |
| 8                               | 2        | R4,R8        | 0Ω, Chip Resistor, ±1%, Size 0603                                                                                         | Standard    |
| 9                               | 1        | R6           | 51kΩ, Chip Resistor, ±1%, Size 0603                                                                                       | Standard    |
| 10                              | 1        | R7           | 200kΩ, Chip Resistor, ±1%, Size 0603                                                                                      | Standard    |
| 11                              | 1        | U1           | SGM61044L, 2.4V to 5.5V Input, 4A, Synchronous Buck Converter, UTDFN-1.5×1.5-6L                                           | SGMICRO     |
| Conclusion: Total 13 components |          |              |                                                                                                                           |             |

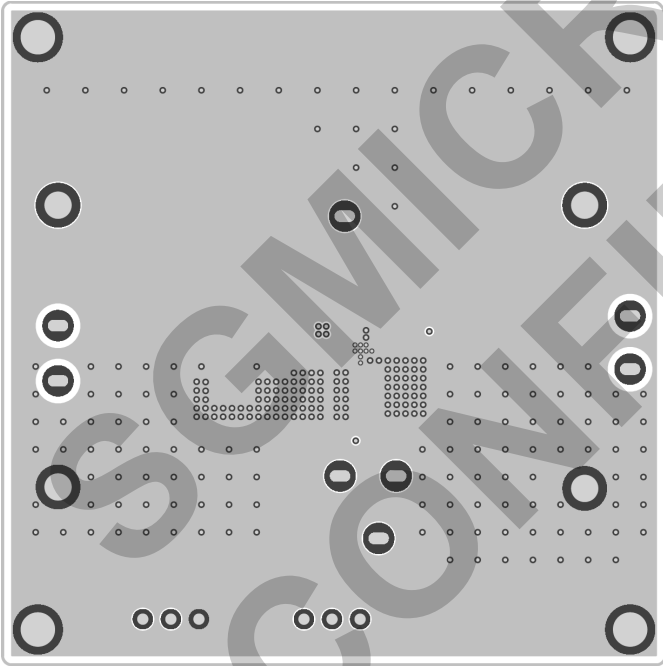
1.3 PCB Layout



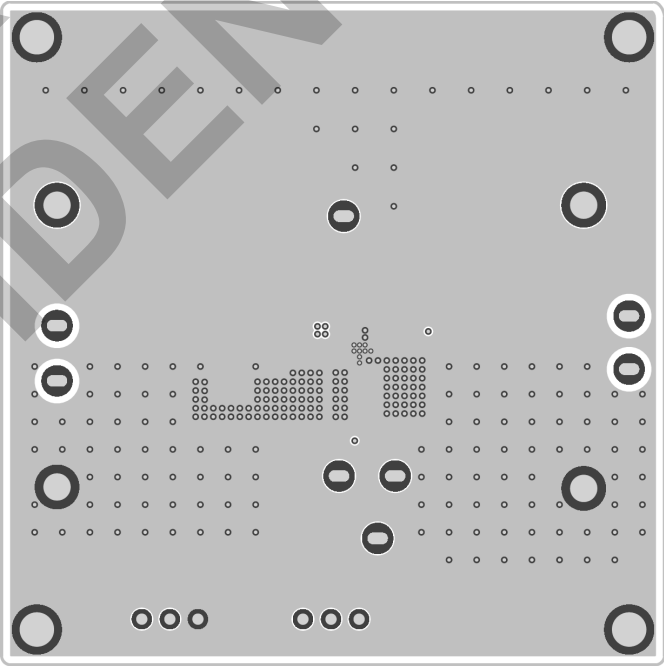
PCB Top Layer



PCB Bottom Layer



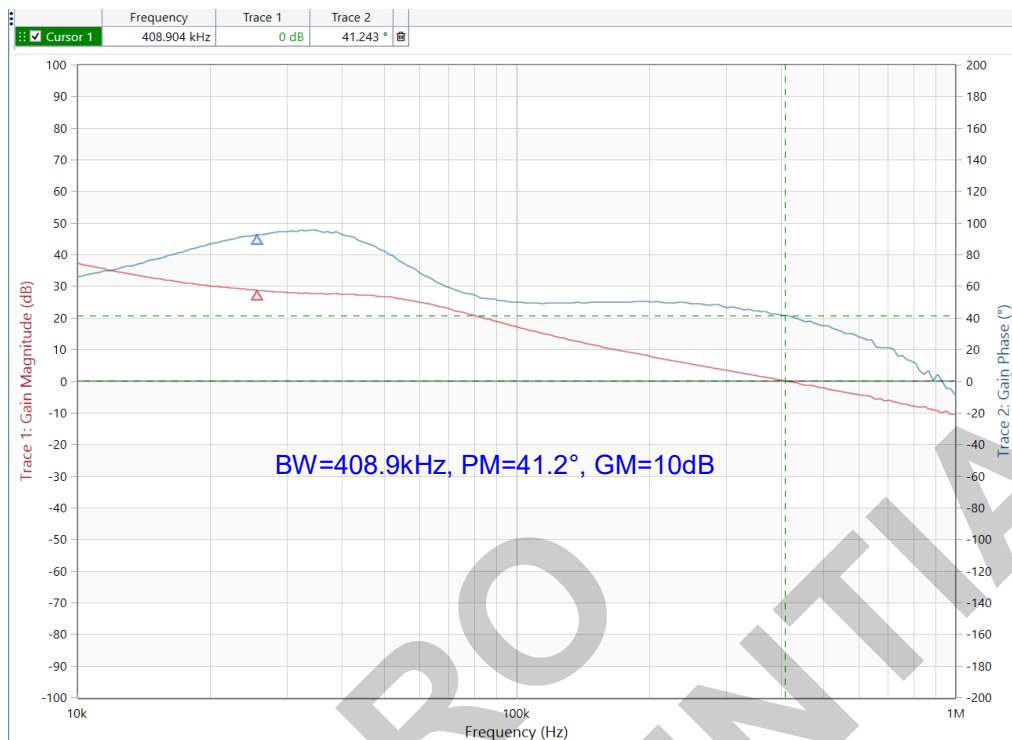
PCB Middle Layer 1



PCB Middle Layer 2

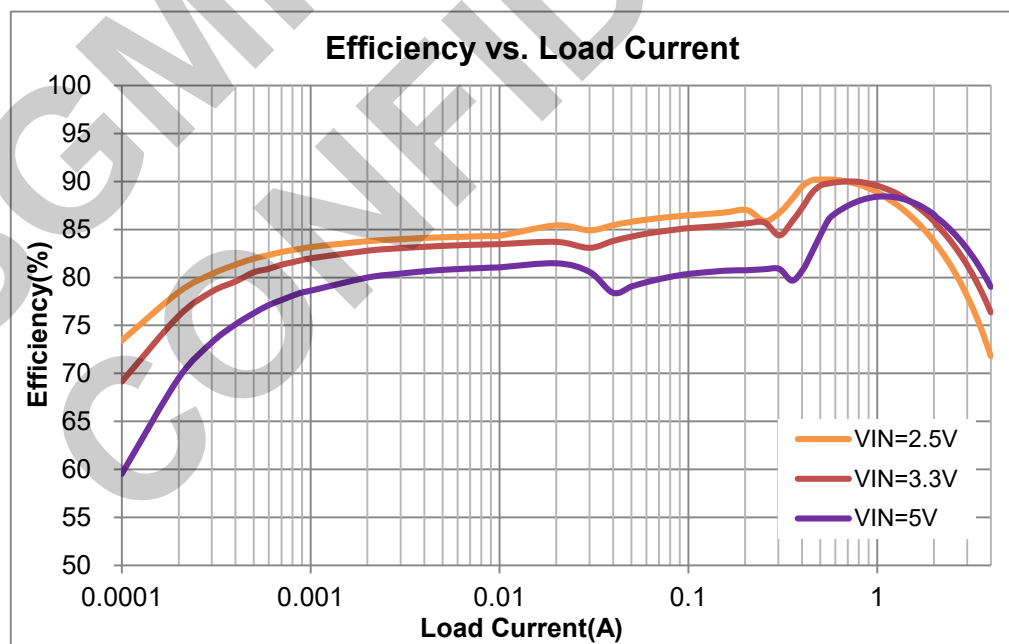
## 2. Bode Plot

Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ ,  $I_{OUT}=4A$ .



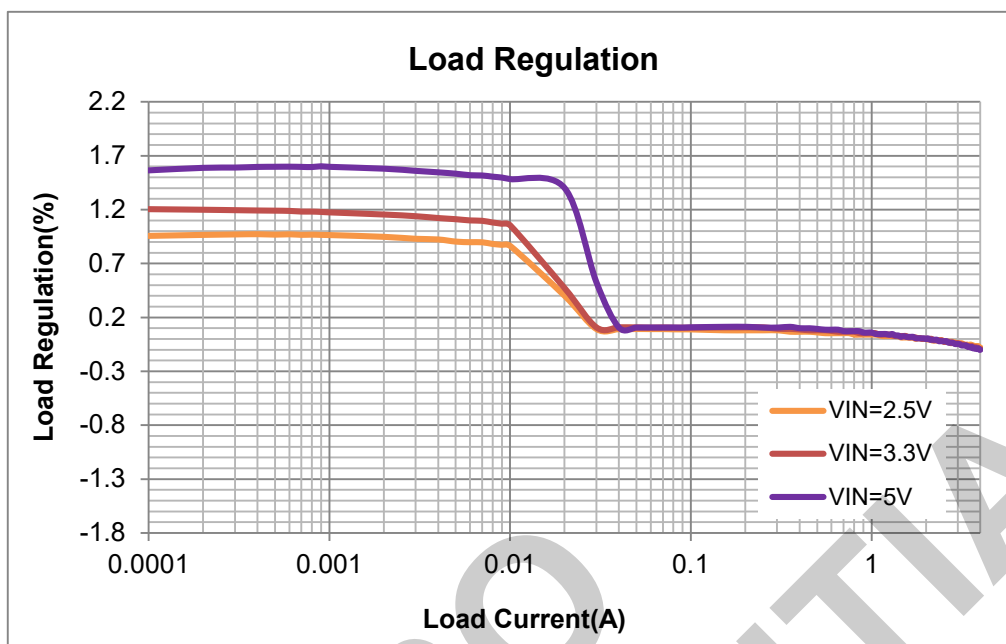
## 3. Efficiency

Test conditions:  $V_{IN}=2.5V/3.3V/5V$ ,  $V_{OUT}=0.75V$ ,  $I_{OUT}=0.1mA$  to  $4A$ .



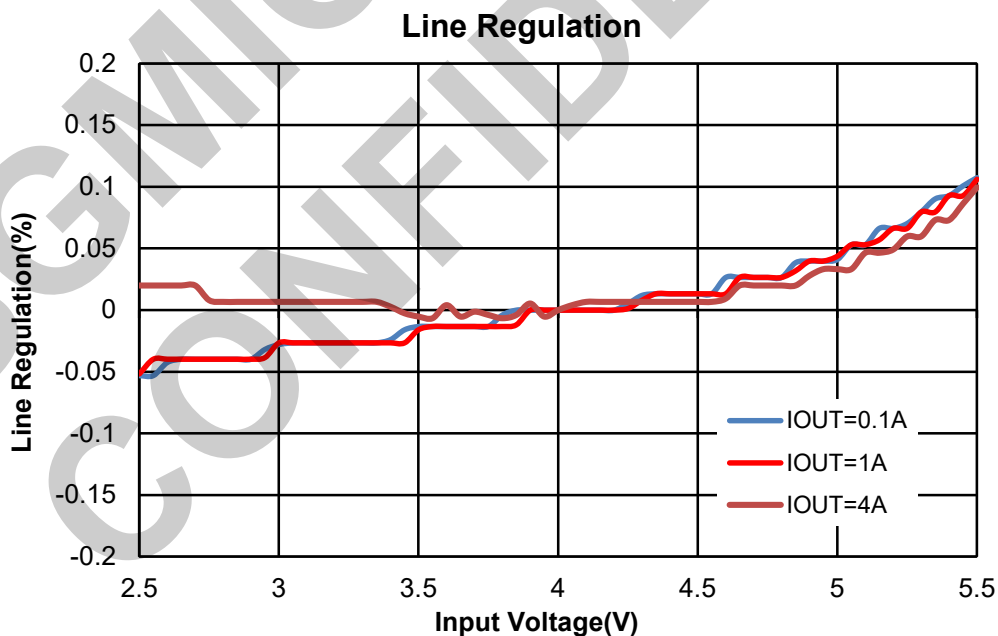
#### 4. Load Regulation

Test conditions:  $V_{IN}=2.5V/3.3V/5V$ ,  $V_{OUT}=0.75V$ ,  $I_{OUT}=0.1mA$  to  $4A$ .



#### 5. Line Regulation

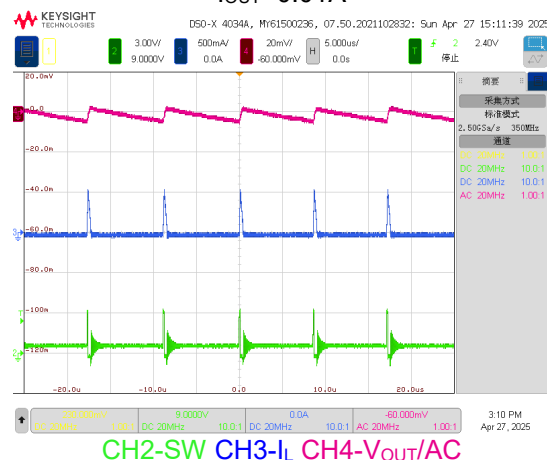
Test conditions:  $V_{IN}=2.5V$  to  $5.5V$ ,  $V_{OUT}=0.75V$ ,  $I_{OUT}=0.1A/1A/4A$ .



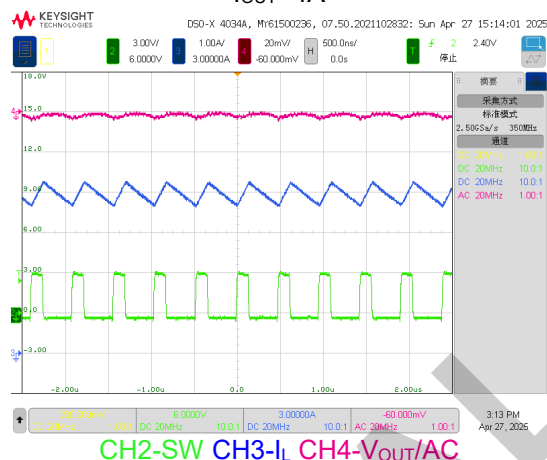
## 6. Output Voltage Ripple

Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ .

$I_{OUT}=0.01A$



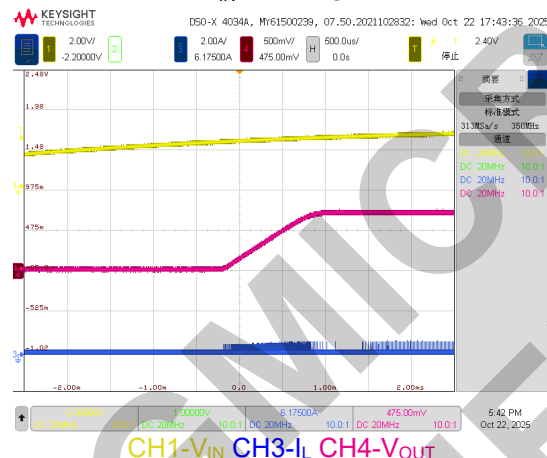
$I_{OUT}=4A$



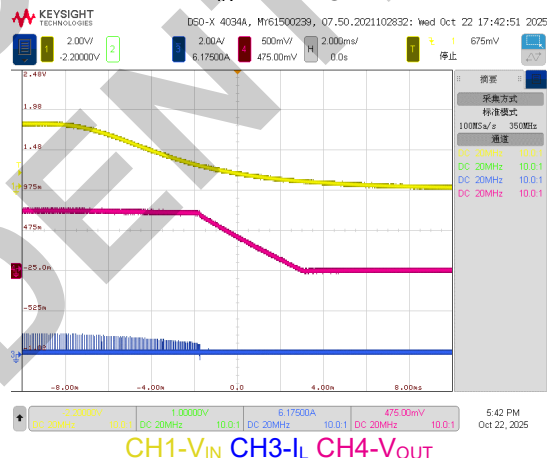
## 7. VIN Power On/Off

Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ ,  $I_{OUT}=0.007A$ .

$V_{IN}$  Power On

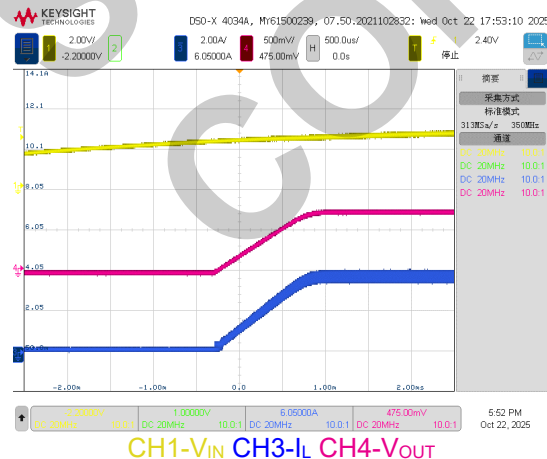


$V_{IN}$  Power Off

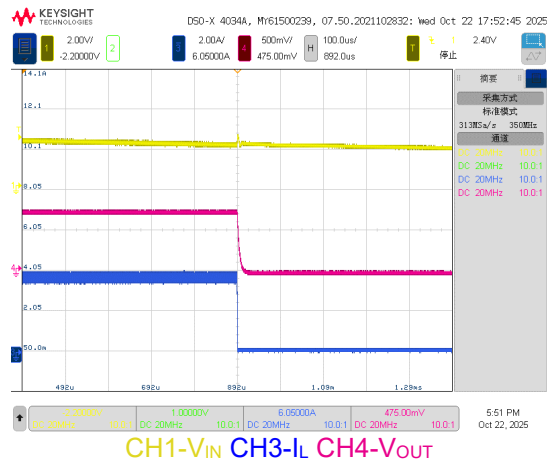


Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ ,  $R_{Load}=0.19\Omega$ .

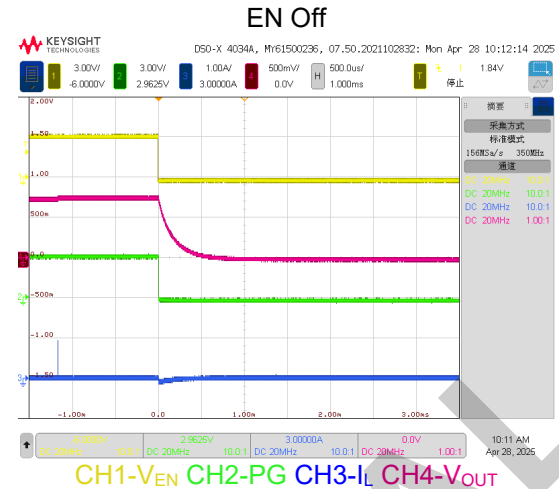
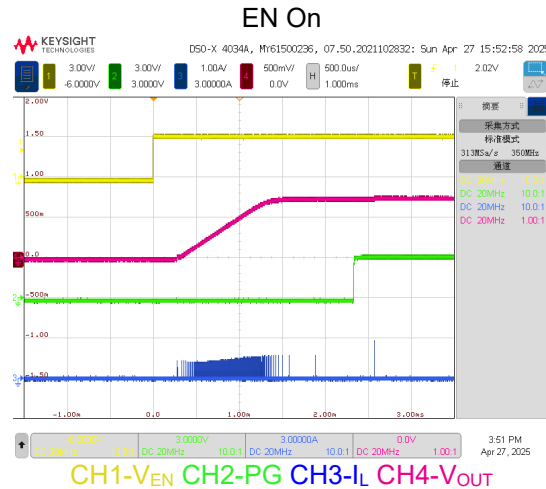
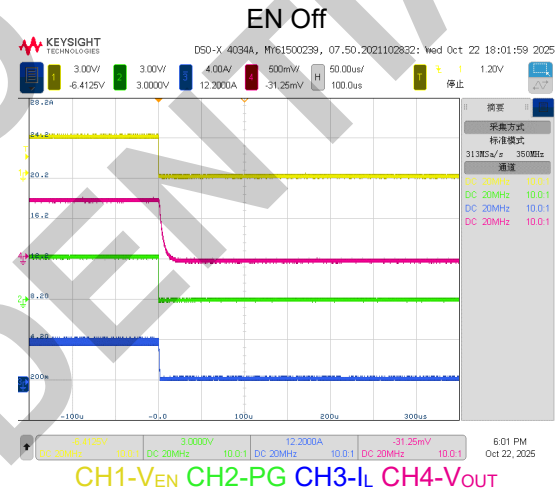
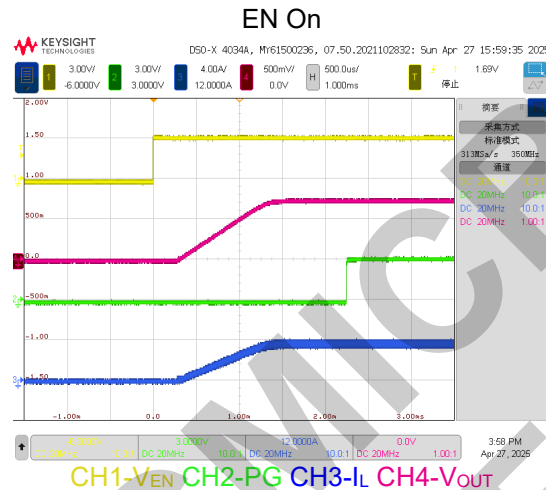
$V_{IN}$  Power On



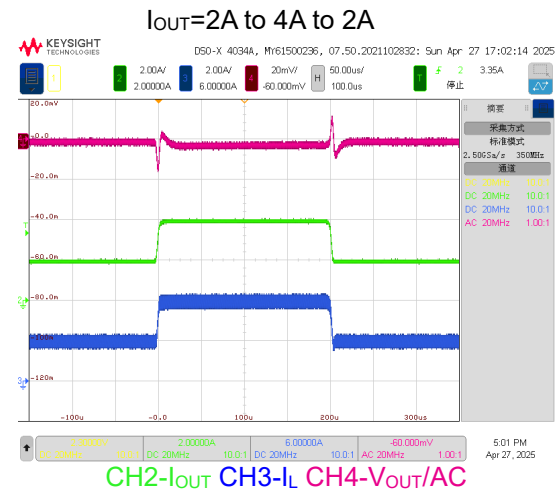
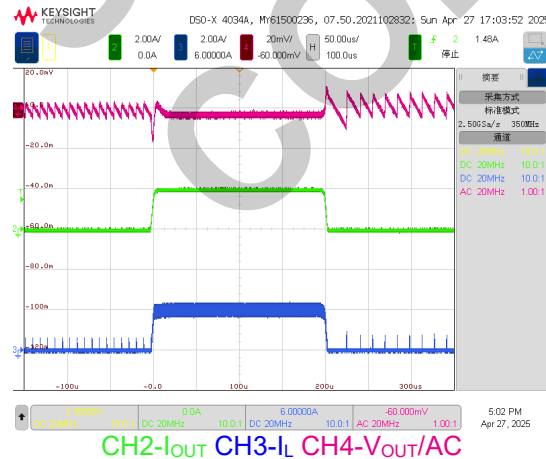
$V_{IN}$  Power Off



## 8. EN On/Off

Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ ,  $I_{OUT}=0A$ .Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ ,  $R_{Load}=0.19\Omega$ .

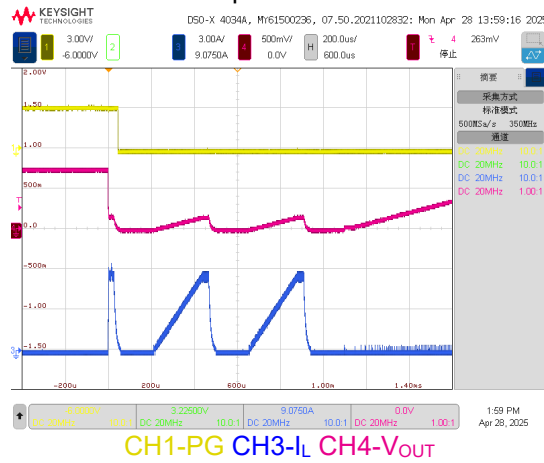
## 9. Load Transient

Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ , Slew rate=0.5A/ $\mu$ s.  
 $I_{OUT}=0.01A$  to  $2A$  to  $0.01A$ 

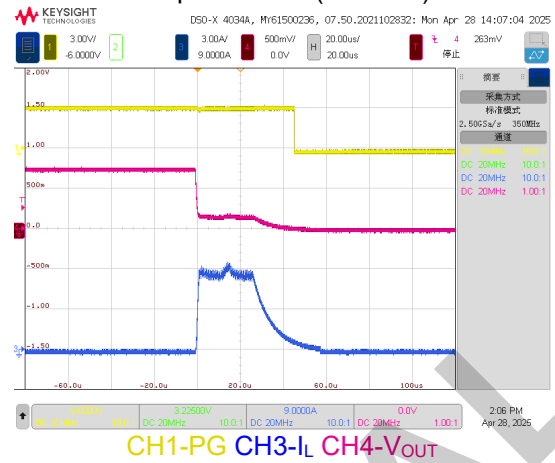
## 10. SCP Entry and Recovery

Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ ,  $R_{Load}=7.5\Omega$ .

Output Shorted



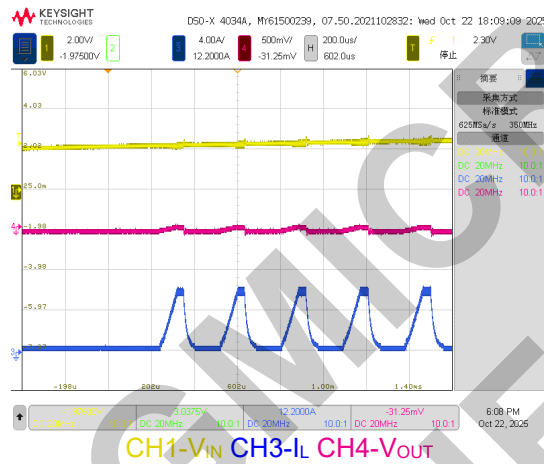
Output Shorted(Zoom In)



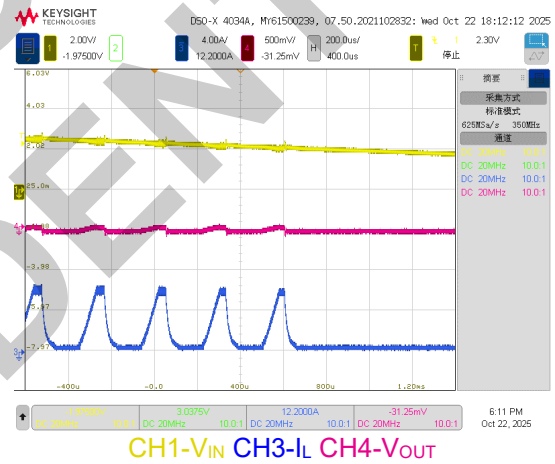
## 11. VIN/EN On/Off during SCP

Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ , Output Shorted.

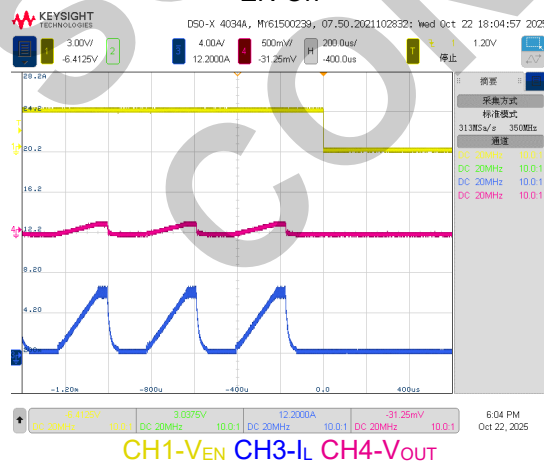
V<sub>IN</sub> Power On



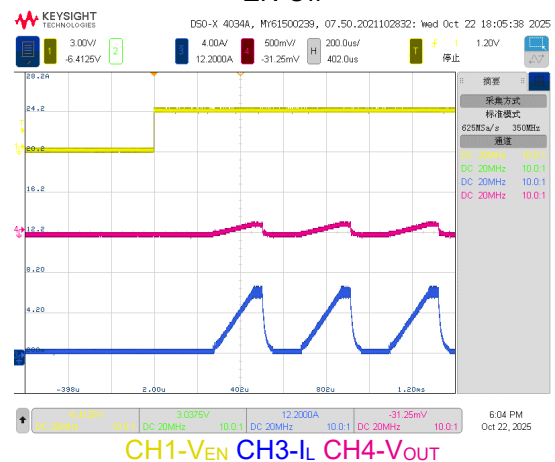
V<sub>IN</sub> Power Off



EN On

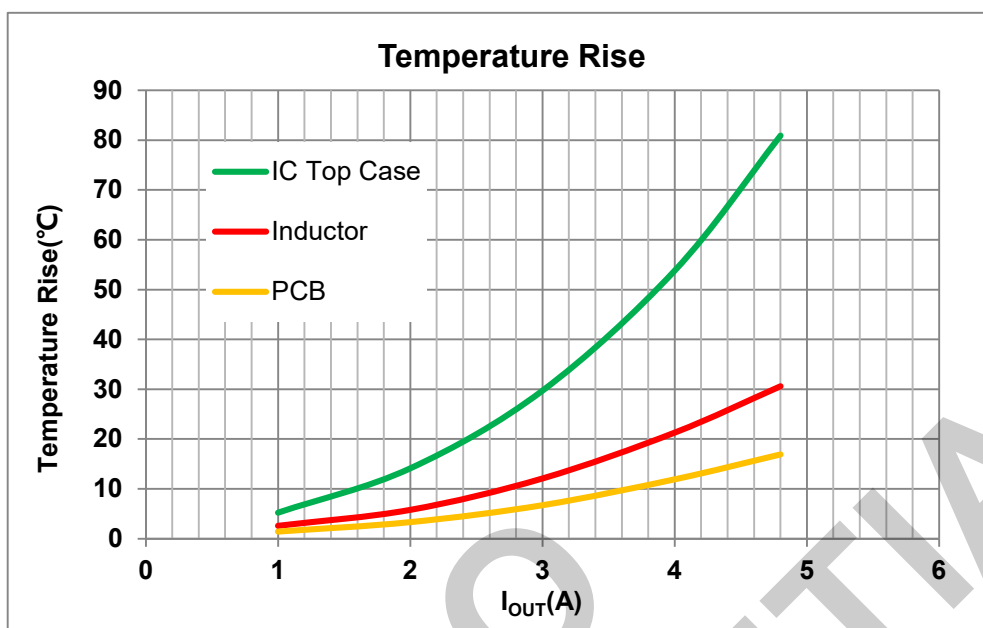


EN Off



## 12. Thermal Test

Test conditions:  $V_{IN}=3.3V$ ,  $V_{OUT}=0.75V$ , Room temperature test, Natural air convection heat dissipation.



| $I_{OUT}(A)$    | 1    | 2    | 3    | 4    | 4.8   |
|-----------------|------|------|------|------|-------|
| IC Top Case(°C) | 29.7 | 38.6 | 54.6 | 78.8 | 106.7 |
| Inductor(°C)    | 27.1 | 30.3 | 37.0 | 46.3 | 56.4  |
| PCB(°C)         | 25.9 | 27.8 | 31.6 | 36.9 | 42.7  |
| Ambient(°C)     | 24.5 | 24.5 | 24.9 | 25.0 | 25.8  |