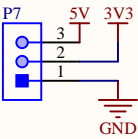
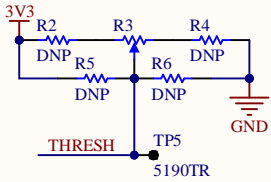


Testpoints are within each sheet.

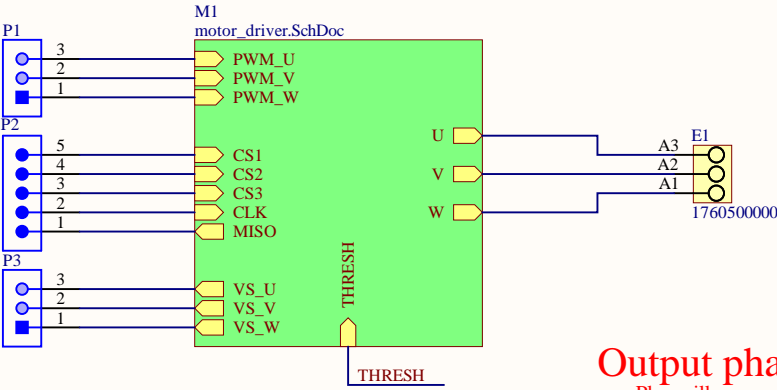
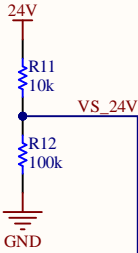
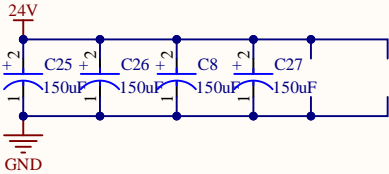
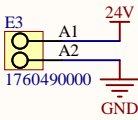
Power for control board



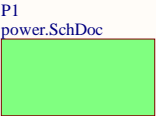
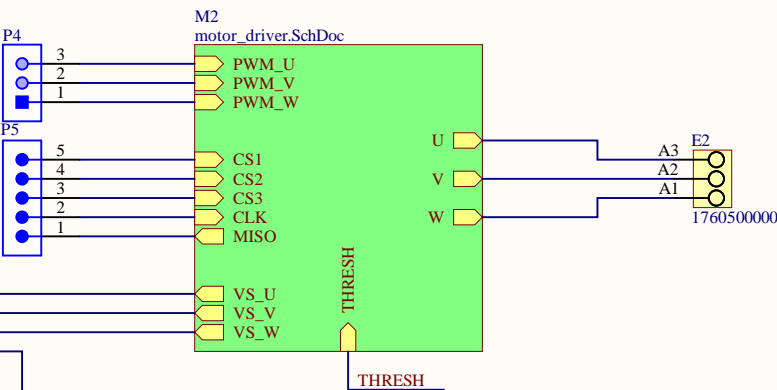
Dead time control



Input

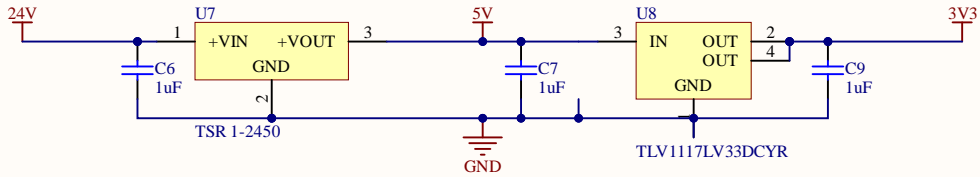


Output phases
Place silkscreen

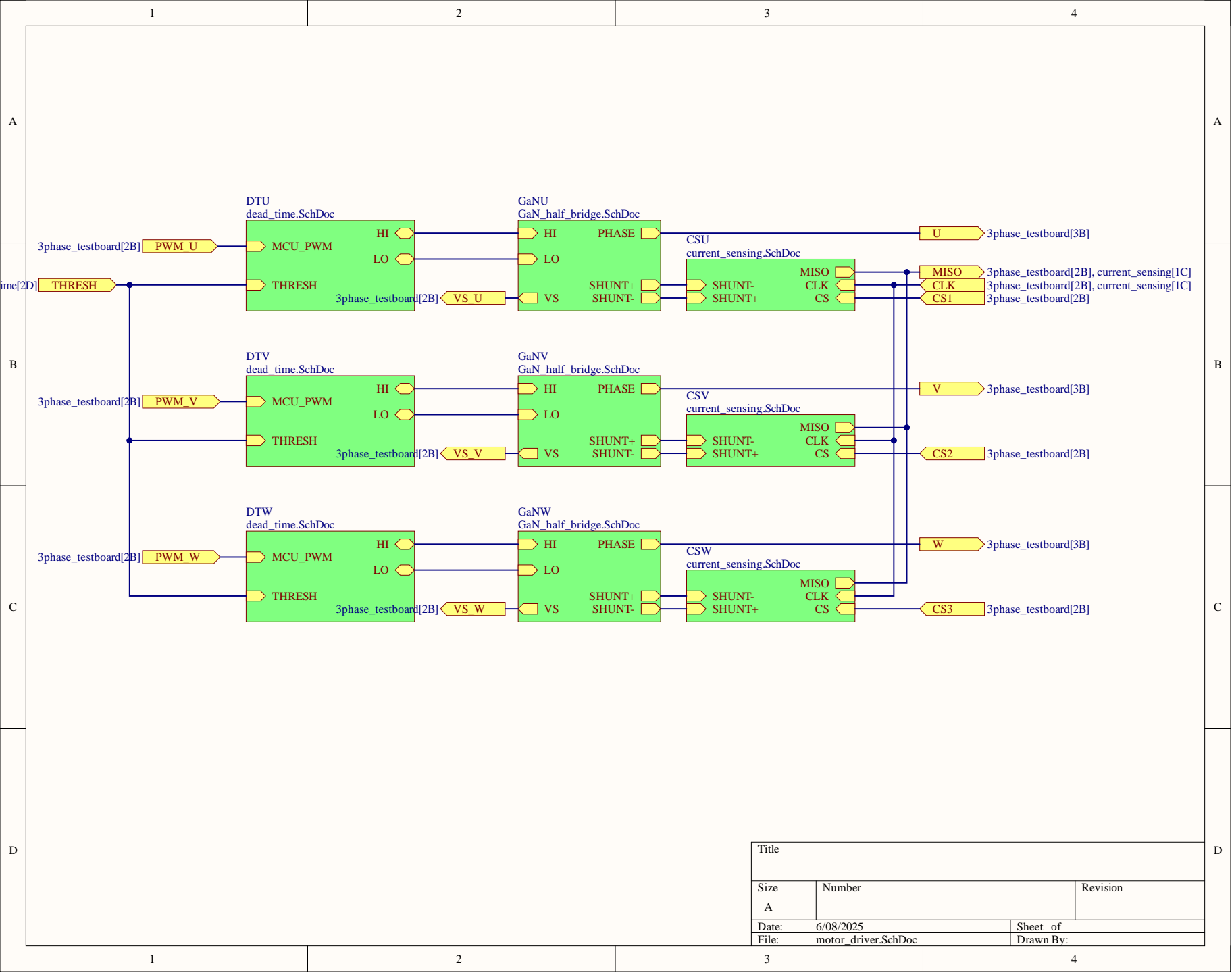


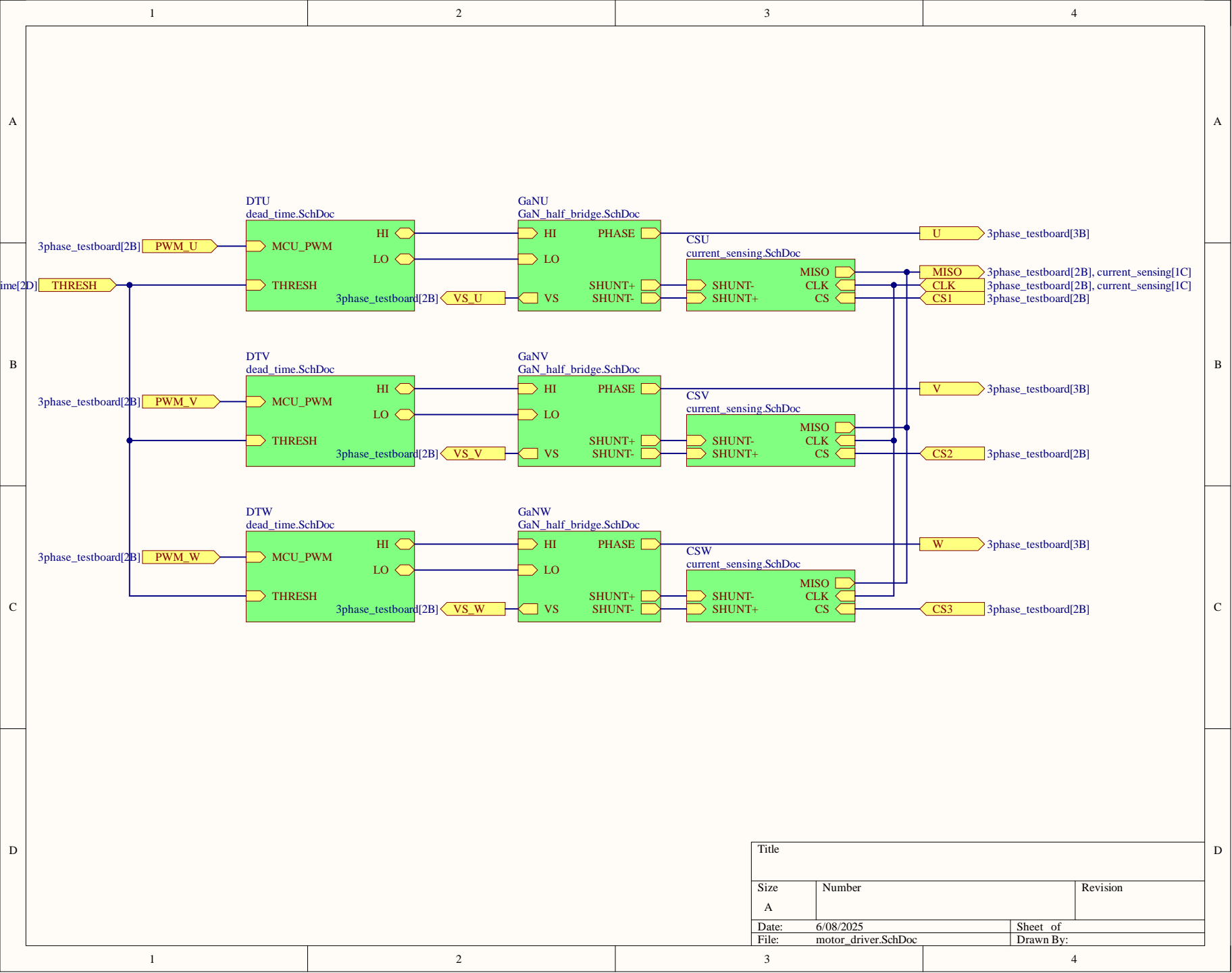
Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	3phase_testboard.SchDoc	Drawn By:

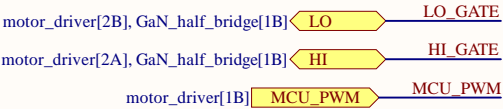
change to SMD version



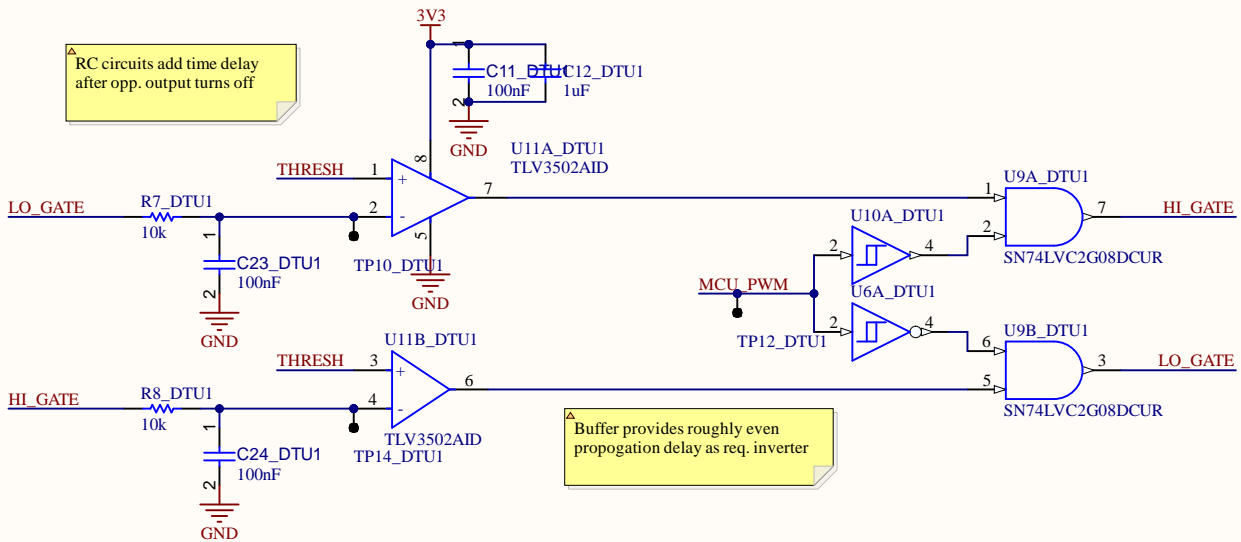
Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	power.SchDoc	Drawn By:



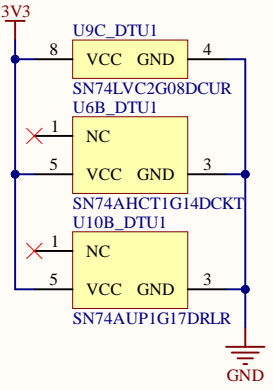
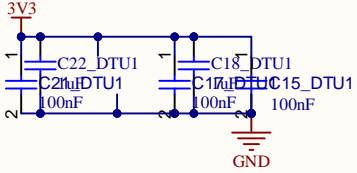




Dead Time Control



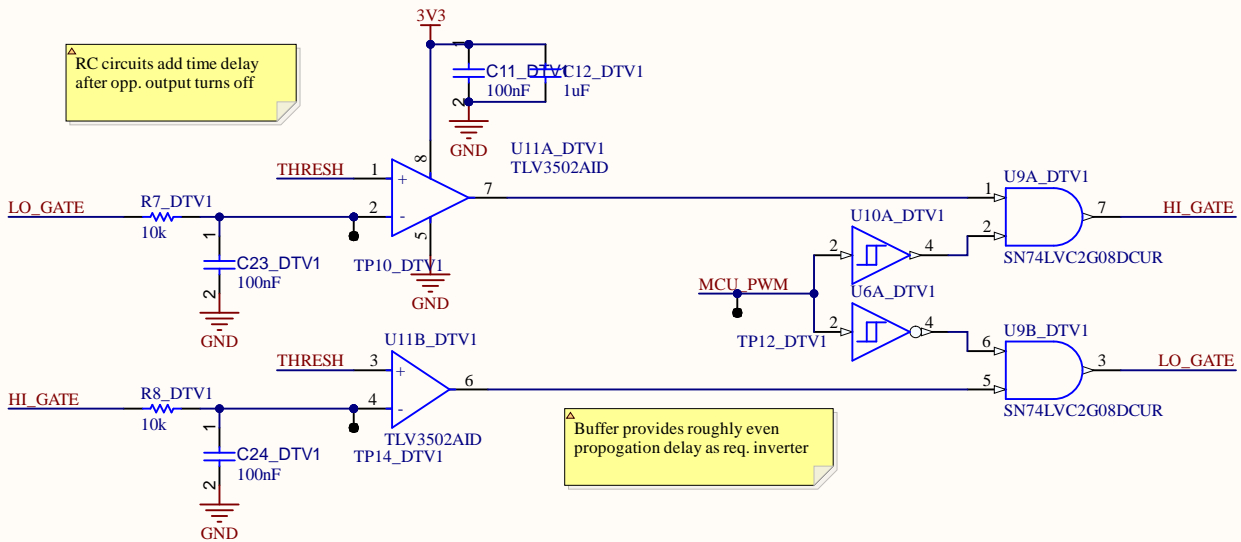
Programmable dead time. Potentiometer for testing, and voltage divider in parallel for permanent setting.



Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	dead_time.SchDoc	Drawn By:

motor_driver[2B], GaN_half_bridge[1B] **LO_GATE**
motor_driver[2A], GaN_half_bridge[1B] **HI_GATE**
motor_driver[1B] **MCU_PWM** **MCU_PWM**

Dead Time Control

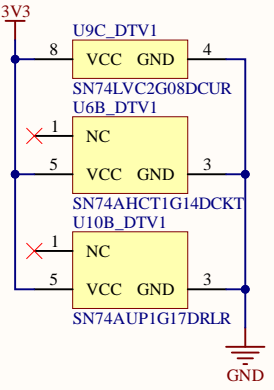
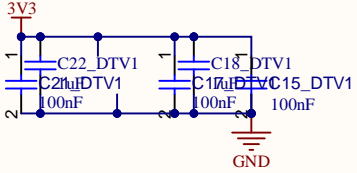


RC circuits add time delay after opp. output turns off

Buffer provides roughly even propogation delay as req. inverter

Programmable dead time. Potentiometer for testing, and voltage divider in parallel for permanent setting.

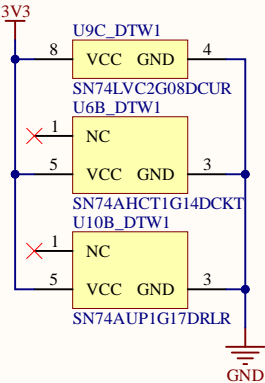
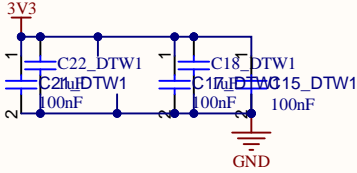
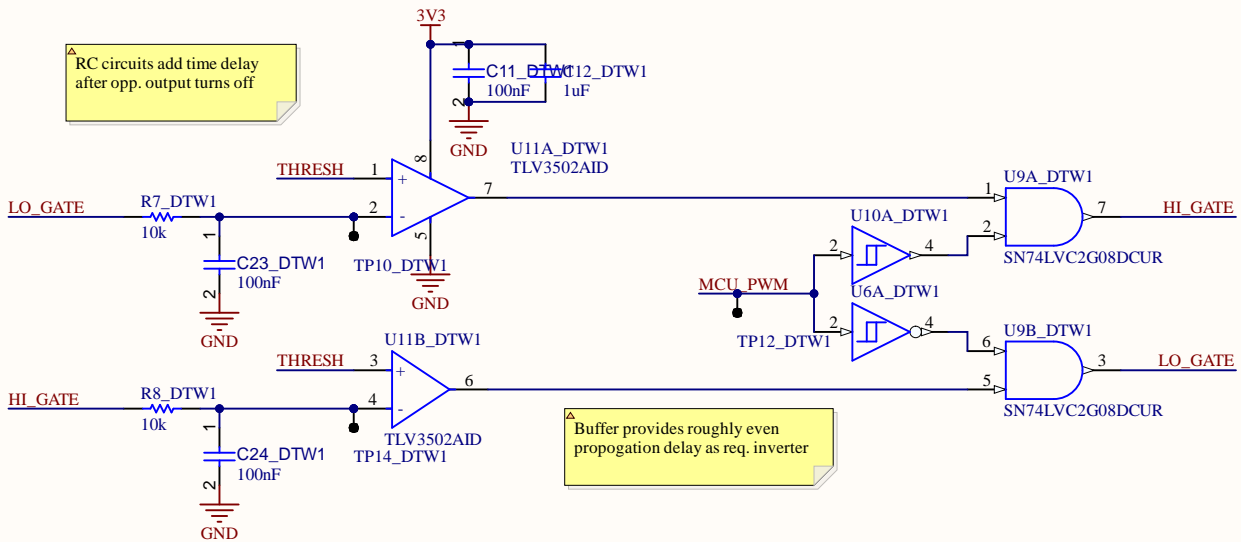
THRESH **THRESH** motor_driver[1B]



Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	dead_time.SchDoc	Drawn By:

motor_driver[2B], GaN_half_bridge[1B] **LO_GATE**
motor_driver[2A], GaN_half_bridge[1B] **HI_GATE**
motor_driver[1B] **MCU_PWM** **MCU_PWM**

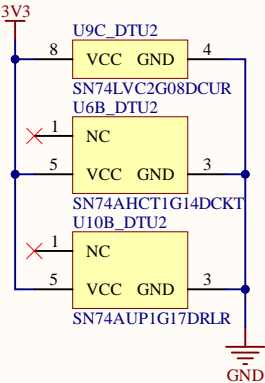
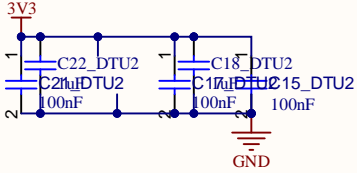
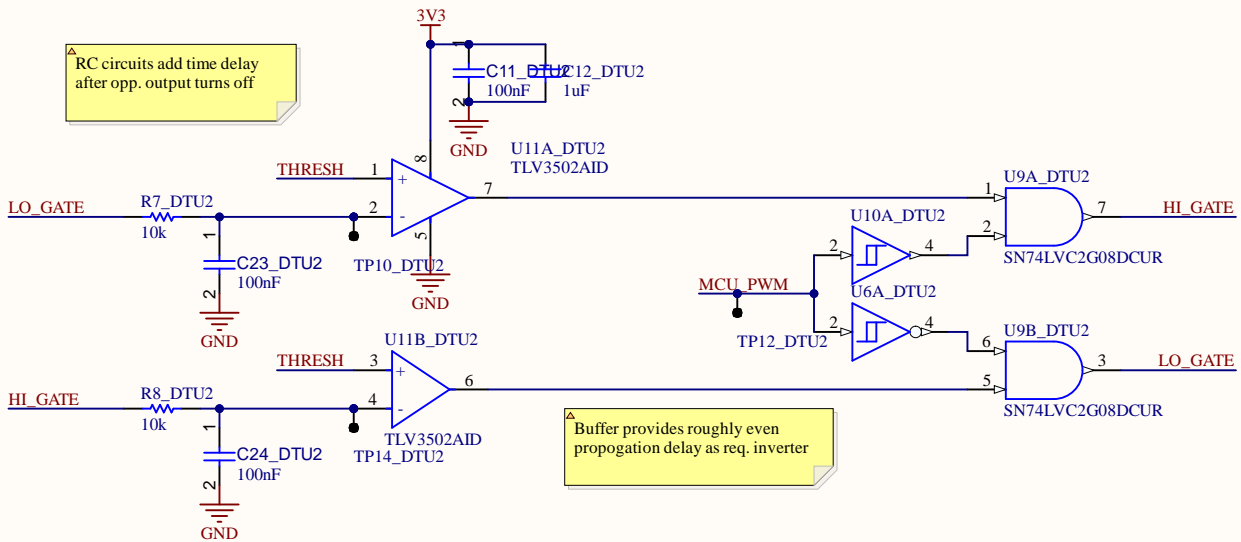
Dead Time Control



Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	dead_time.SchDoc	Drawn By:

motor_driver[2B], GaN_half_bridge[1B] **LO_GATE**
motor_driver[2A], GaN_half_bridge[1B] **HI_GATE**
motor_driver[1B] **MCU_PWM**

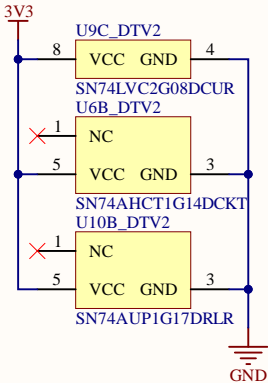
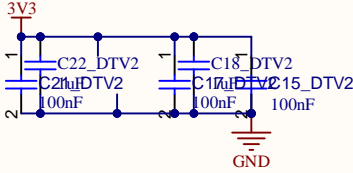
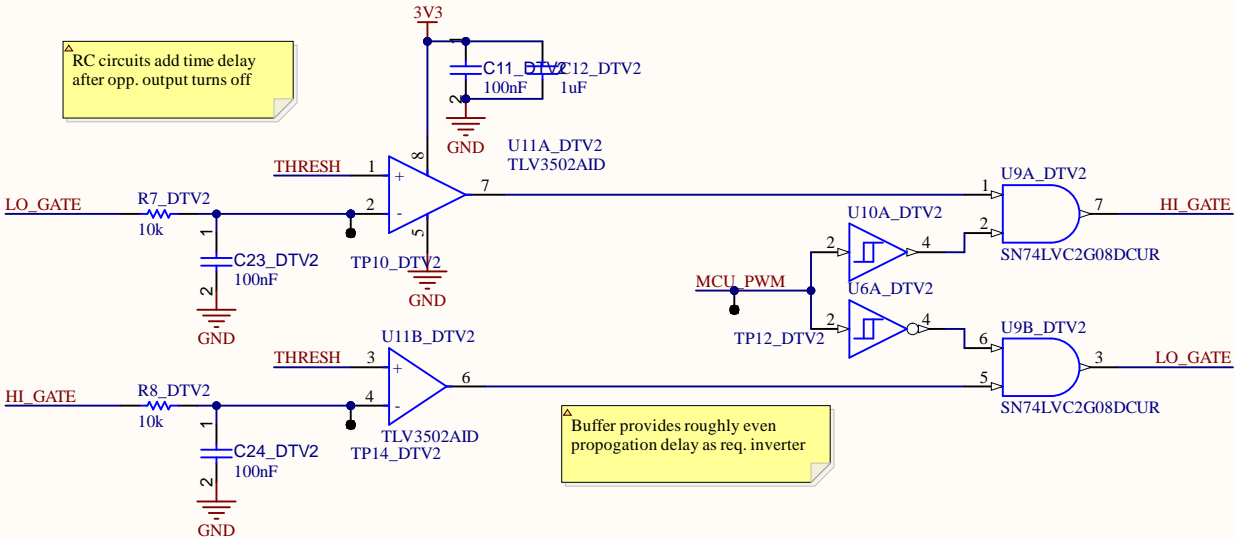
Dead Time Control



Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	dead_time.SchDoc	Drawn By:

motor_driver[2B], GaN_half_bridge[1B] **LO_GATE**
motor_driver[2A], GaN_half_bridge[1B] **HI_GATE**
motor_driver[1B] **MCU_PWM**

Dead Time Control

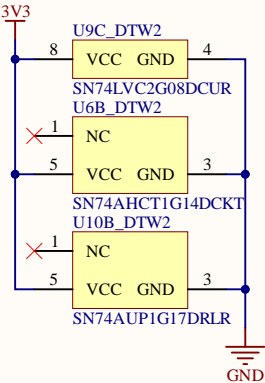
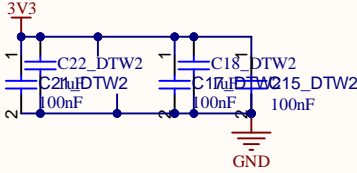
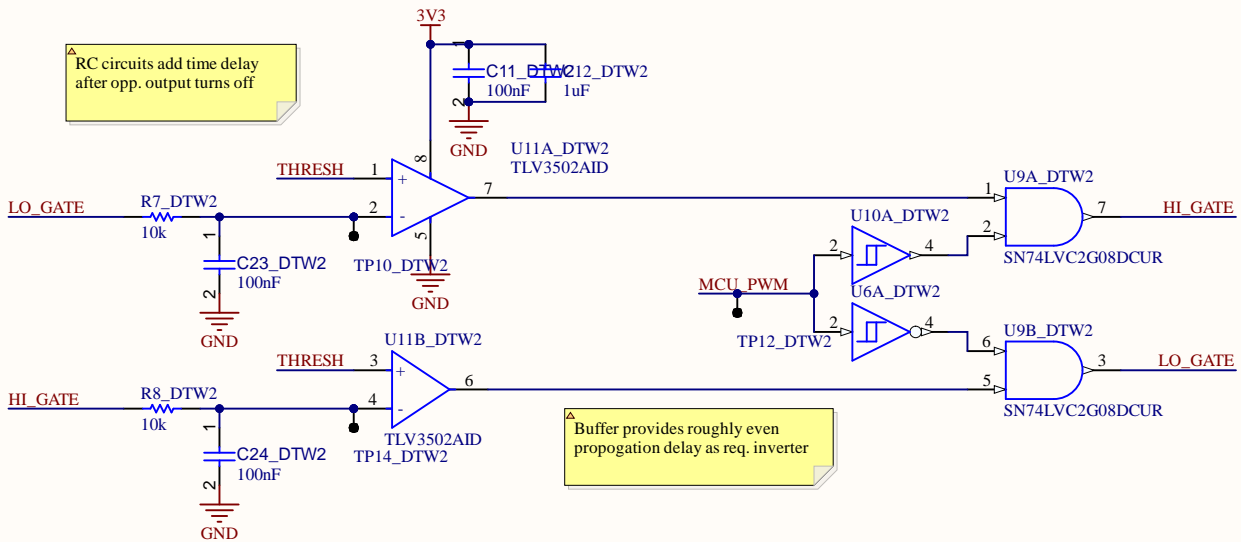


THRESH **THRESH** motor_driver[1B]

Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	dead_time.SchDoc	Drawn By:

motor_driver[2B], GaN_half_bridge[1B] **LO_GATE**
motor_driver[2A], GaN_half_bridge[1B] **HI_GATE**
motor_driver[1B] **MCU_PWM**

Dead Time Control



THRESH **THRESH** motor_driver[1B]

Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	dead_time.SchDoc	Drawn By:

△ Include TPs on this sheet

△ Possible ICs for sync rect logic circuit AND:

- EASILY BEST ONE: TI SN74AUC1G08, 2ns max
- 74LVC1G08, tpd=6ns max at 3V3

△ Populate C2 with a higher-voltage 0.1 μ F cap



VCC capacitor: C1
BOOT capacitor:
Not found

Place caps as close
as possible to pins,
as shown right.

Place caps as close as possible to pins, as shown right.



Figure 8-7. External Component Placement (Multi-layer PCB)

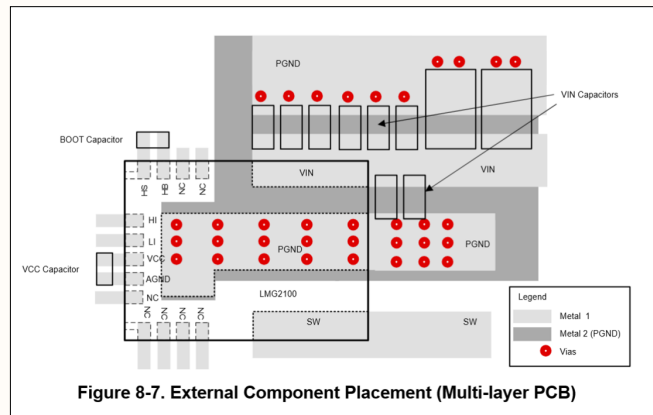
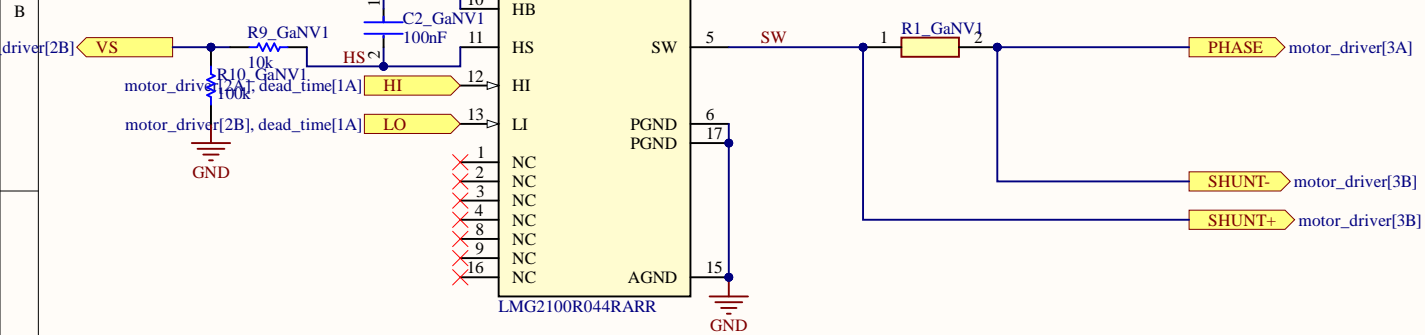
D

△ Include TPs on this sheet

△ Possible ICs for sync rect logic circuit AND:

- EASILY BEST ONE: TI SN74AUC1G08, 2ns max
- 74LVC1G08, tpd=6ns max at 3V3

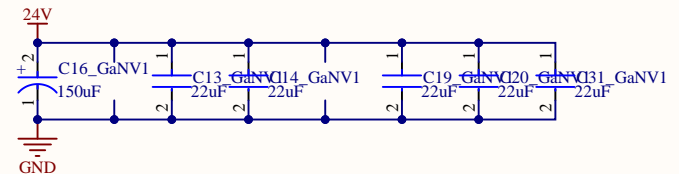
△ Populate C2 with a higher-voltage 0.1uF cap



VCC capacitor: **C1**
 BOOT capacitor:
Not found

Place caps as close
 as possible to pins,
 as shown right.

Place caps as close as possible to pins, as shown right.

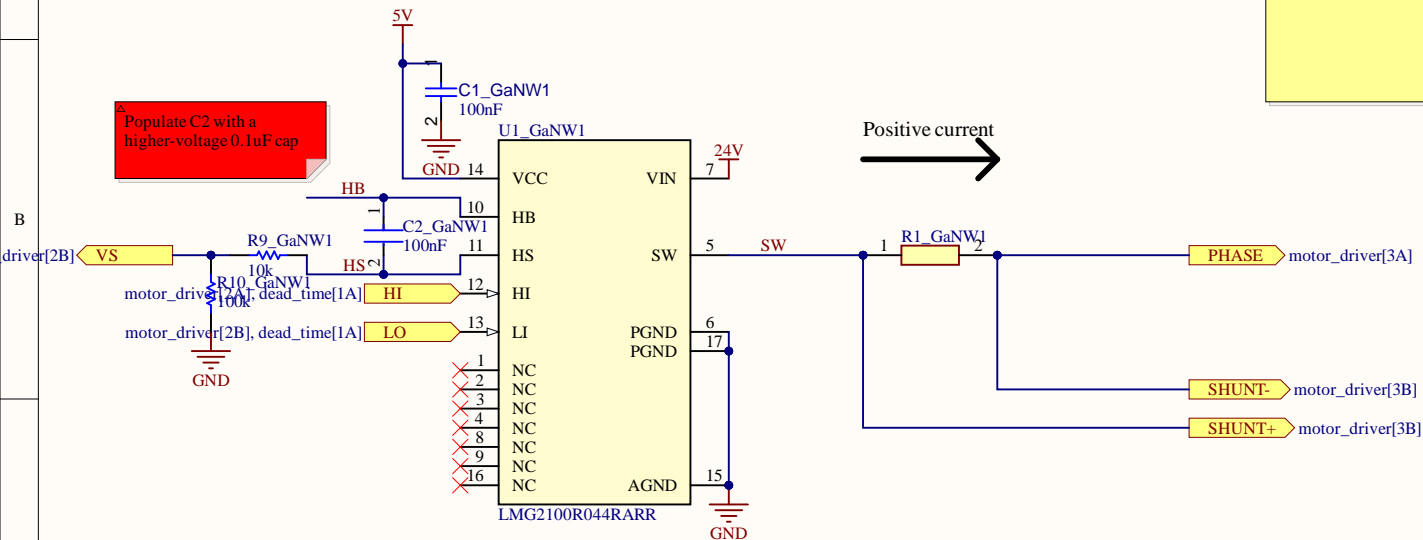


Title		
Size A	Number	Revision
Date:	6/08/2025	Sheet of
File:	GaN_half_bridge.SchDoc	Drawn By:

Include TPs on this sheet

Possible ICs for sync rect logic circuit AND:
- EASILY BEST ONE: TI SN74AUC1G08, 2ns max
- 74LVC1G08, tpd=6ns max at 3V3

Populate C2 with a higher-voltage 0.1uF cap



VCC capacitor: C1
BOOT capacitor: Not found

Place caps as close as possible to pins, as shown right.

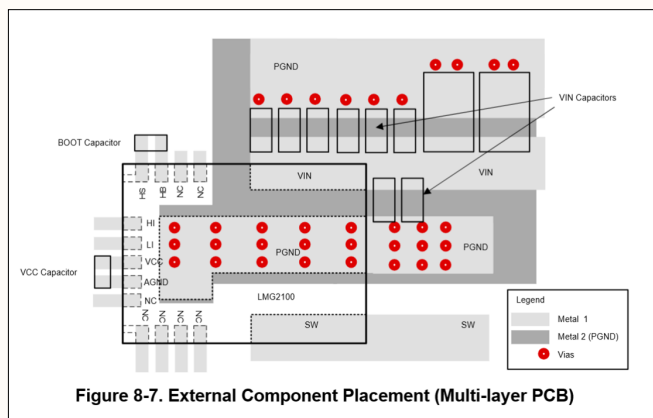
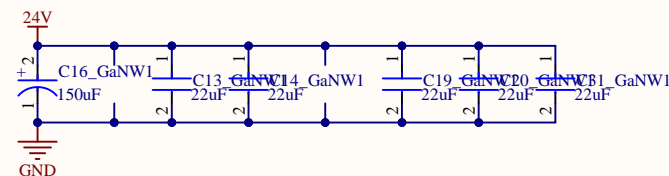


Figure 8-7. External Component Placement (Multi-layer PCB)



Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	GaN_half_bridge.SchDoc	Drawn By:

△ Include TPs on this sheet

△ Possible ICs for sync rect logic circuit AND:

- EASILY BEST ONE: TI SN74AUC1G08, 2ns max
- 74LVC1G08, tpd=6ns max at 3V3

△ Populate C2 with a higher-voltage 0.1uF cap



VCC capacitor: C1
BOOT capacitor:
Not found

Place caps as close
as possible to pins,
as shown right.

Place caps as close as possible to pins, as shown right.



Figure 8-7. External Component Placement (Multi-layer PCB)

D

△ Include TPs on this sheet

△ Possible ICs for sync rect logic circuit AND:

- EASILY BEST ONE: TI SN74AUC1G08, 2ns max
- 74LVC1G08, tpd=6ns max at 3V3

△ Populate C2 with a higher-voltage 0.1uF cap



VCC capacitor: C1
BOOT capacitor:
Not found

Place caps as close
as possible to pins,
as shown right.

Place caps as close as possible to pins, as shown right.



Figure 8-7. External Component Placement (Multi-layer PCB)

D

△ Include TPs on this sheet

△ Possible ICs for sync rect logic circuit AND:

- EASILY BEST ONE: TI SN74AUC1G08, 2ns max
- 74LVC1G08, tpd=6ns max at 3V3

△ Populate C2 with a higher-voltage 0.1uF cap



VCC capacitor: C1
BOOT capacitor:
Not found

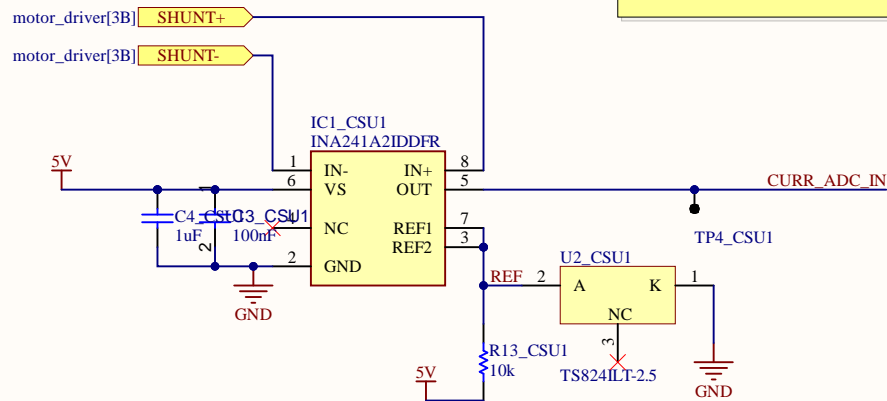
Place caps as close
as possible to pins,
as shown right.

Place caps as close as possible to pins, as shown right.



Figure 8-7. External Component Placement (Multi-layer PCB)

D



INA241 gains available:

-

INA241 testing configurations, to see if higher Vsupply and V divider on output improves accuracy and noise

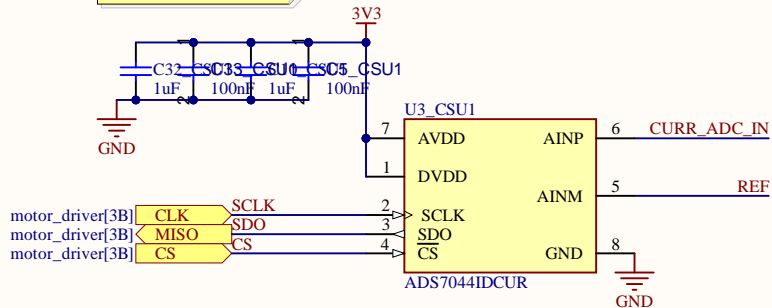
Default INA241 configuration:

- Powered from 3V3
- [Not found] is 0 ohm
- Output is not voltage divided
- Max output is 3V3, determined by supply

20V INA241 configuration:

- Powered from 20V
- [Not found] is 50kR
- Output voltage is voltage divided to 1/6
- Max output is 3.33V

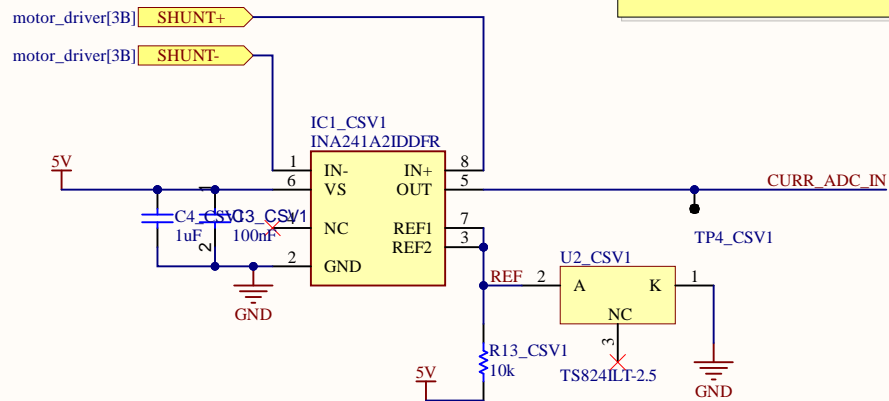
Place one cap close to each Vdd pin.



- Unipolar, Differential Input Range: -AVDD to AVDD

This is not the fastest ADC in the world. It can do a maximum of 1MSPS, whereas other ADCs can hit 5MSPS. But it takes 3V3 supply, it's small, and I have experience with it.

Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	current_sensing_SchDoc	Drawn By:



INA241 gains available:

-

INA241 testing configurations, to see if higher Vsupply and V divider on output improves accuracy and noise

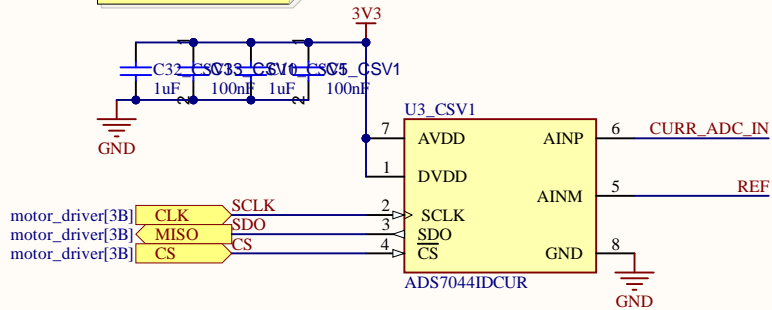
Default INA241 configuration:

- Powered from 3V3
- [Not found] is 0 ohm
- Output is not voltage divided
- Max output is 3V3, determined by supply

20V INA241 configuration:

- Powered from 20V
- [Not found] is 50kR
- Output voltage is voltage divided to 1/6
- Max output is 3.33V

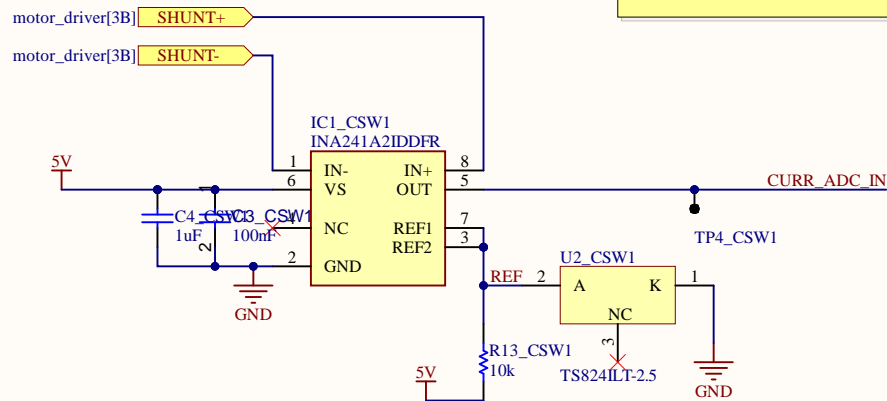
Place one cap close to each Vdd pin.



- Unipolar, Differential Input Range: -AVDD to AVDD

This is not the fastest ADC in the world. It can do a maximum of 1MSPS, whereas other ADCs can hit 5MSPS. But it takes 3V3 supply, it's small, and I have experience with it.

Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	current_sensing_SchDoc	Drawn By:



INA241 gains available:

-

INA241 testing configurations, to see if higher Vsupply and V divider on output improves accuracy and noise

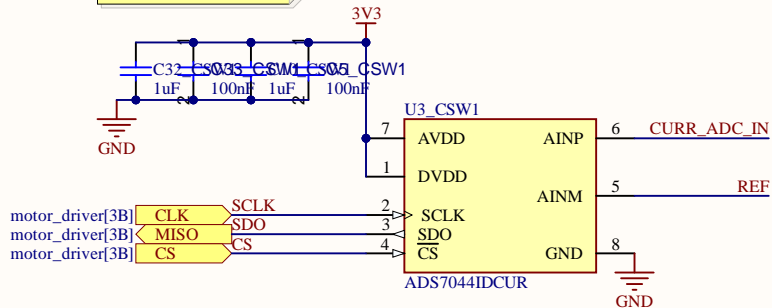
Default INA241 configuration:

- Powered from 3V3
- [Not found] is 0 ohm
- Output is not voltage divided
- Max output is 3V3, determined by supply

20V INA241 configuration:

- Powered from 20V
- [Not found] is 50kR
- Output voltage is voltage divided to 1/6
- Max output is 3.33V

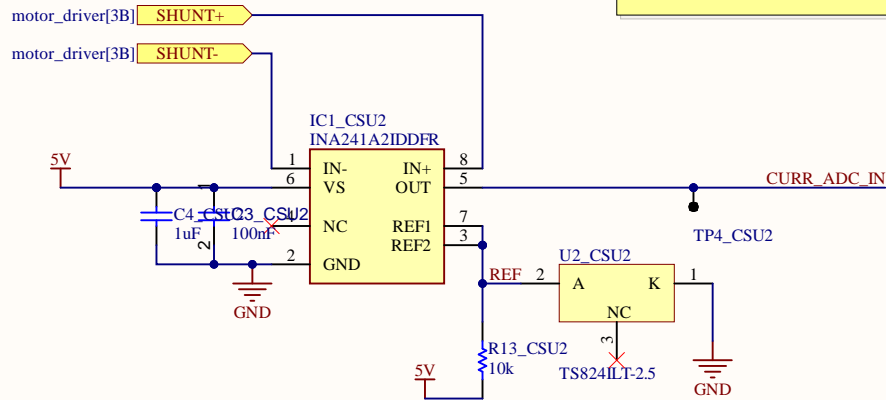
Place one cap close to each Vdd pin.



- Unipolar, Differential Input Range: -AVDD to AVDD

This is not the fastest ADC in the world. It can do a maximum of 1MSPS, whereas other ADCs can hit 5MSPS. But it takes 3V3 supply, it's small, and I have experience with it.

Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	current_sensing_SchDoc	Drawn By:



INA241 gains available:

-

INA241 testing configurations, to see if higher Vsupply and V divider on output improves accuracy and noise

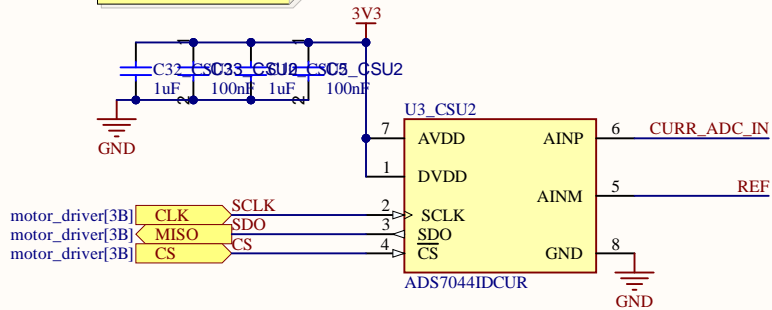
Default INA241 configuration:

- Powered from 3V3
- [Not found] is 0 ohm
- Output is not voltage divided
- Max output is 3V3, determined by supply

20V INA241 configuration:

- Powered from 20V
- [Not found] is 50kR
- Output voltage is voltage divided to 1/6
- Max output is 3.33V

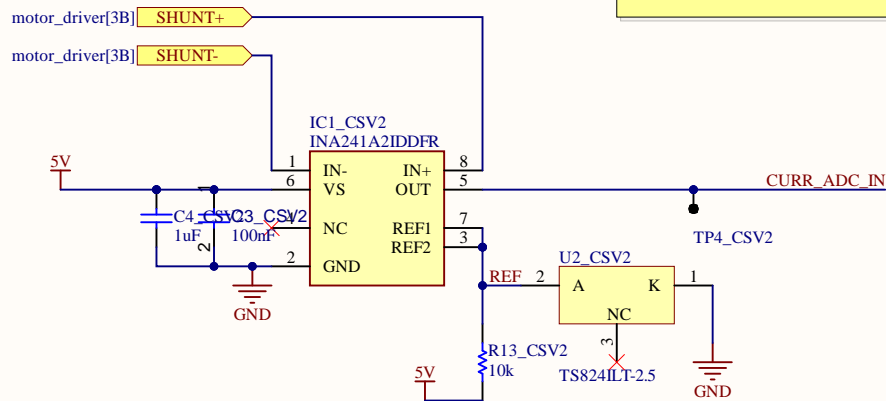
Place one cap close to each Vdd pin.



- Unipolar, Differential Input Range: -AVDD to AVDD

This is not the fastest ADC in the world. It can do a maximum of 1MSPS, whereas other ADCs can hit 5MSPS. But it takes 3V3 supply, it's small, and I have experience with it.

Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	current_sensing_SchDoc	Drawn By:



INA241 gains available:

-

INA241 testing configurations, to see if higher Vsupply and V divider on output improves accuracy and noise

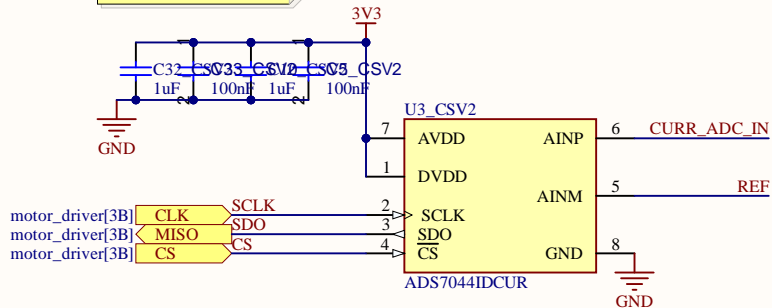
Default INA241 configuration:

- Powered from 3V3
- [Not found] is 0 ohm
- Output is not voltage divided
- Max output is 3V3, determined by supply

20V INA241 configuration:

- Powered from 20V
- [Not found] is 50kR
- Output voltage is voltage divided to 1/6
- Max output is 3.33V

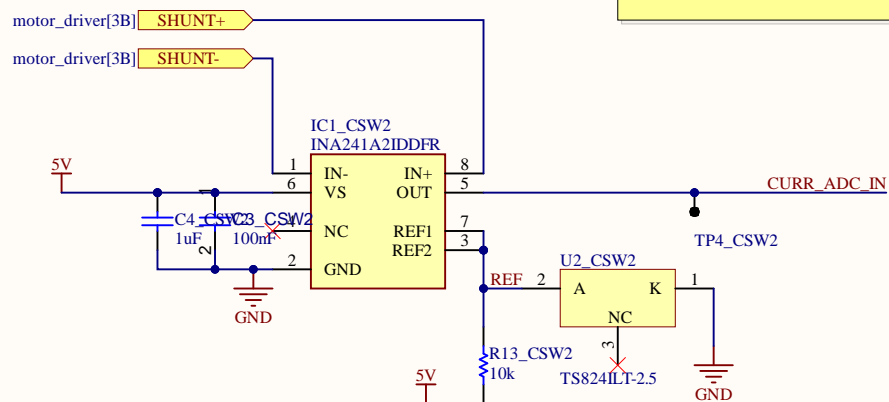
Place one cap close to each Vdd pin.



- Unipolar, Differential Input Range: -AVDD to AVDD

This is not the fastest ADC in the world. It can do a maximum of 1MSPS, whereas other ADCs can hit 5MSPS. But it takes 3V3 supply, it's small, and I have experience with it.

Title		
Size	Number	Revision
A		
Date:	6/08/2025	Sheet of
File:	current_sensing_SchDoc	Drawn By:



INA241 gains available:

INA241 testing configurations, to see if higher V supply and V divider on output improves accuracy and noise

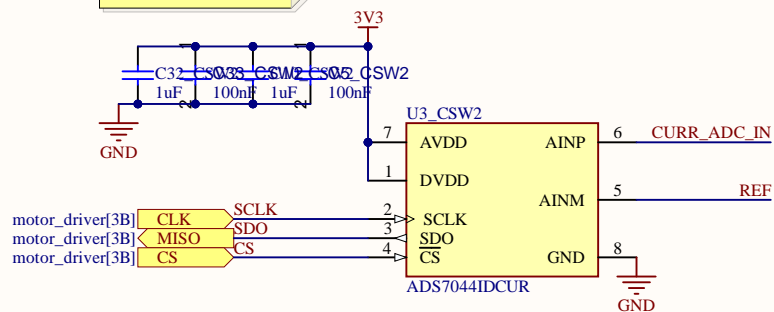
Default INA241 configuration:

- Powered from 3V3
- **Not found** is 0 ohm
- Output is not voltage divided
- Max output is 3V3, determined by supply

20V INA241 configuration:

- Powered from 20V
- **Not found** is 50kR
- Output voltage is voltage divided to 1/6
- Max output is 3.33V

△ Place one cap close to each Vdd pin.



- Unipolar, Differential Input Range: $-AV_{DD}$ to AV_{DD}

△ This is not the fastest ADC in the world. It can do a maximum of 1MSPS, whereas other ADCs can hit 5MSPS. But it takes 3V3 supply, it's small, and I have experience with it.

Title		
Size A	Number	Revision
Date:	6/08/2025	Sheet of
File:	current_sensing.SchDoc	Drawn By: