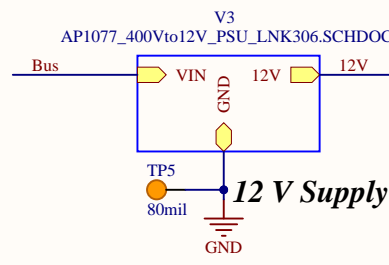


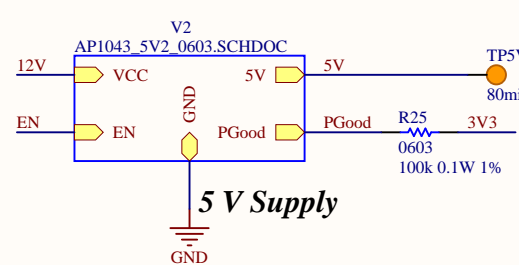
DC bus input



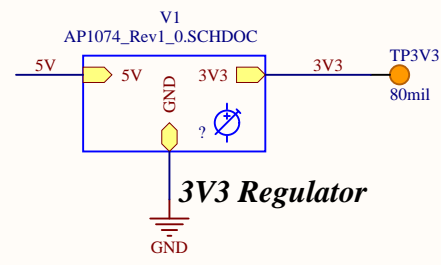
High Voltage



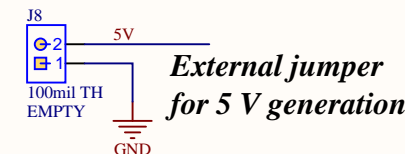
12 V Supply



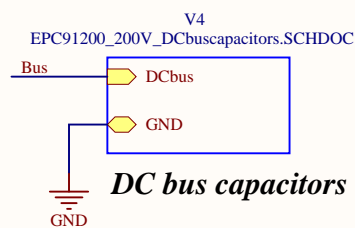
5 V Supply



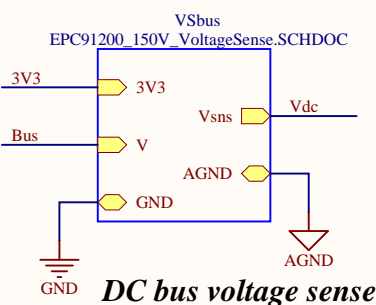
3V3 Regulator



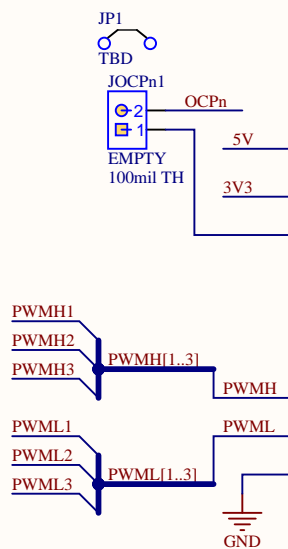
External jumper for 5 V generation



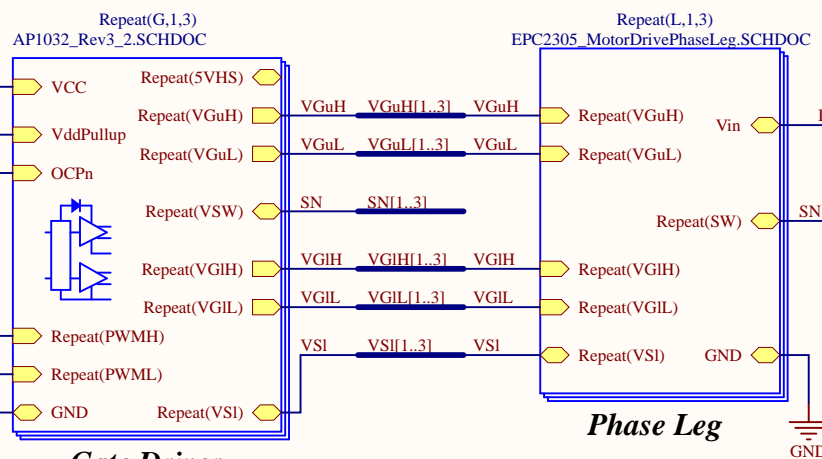
DC bus capacitors



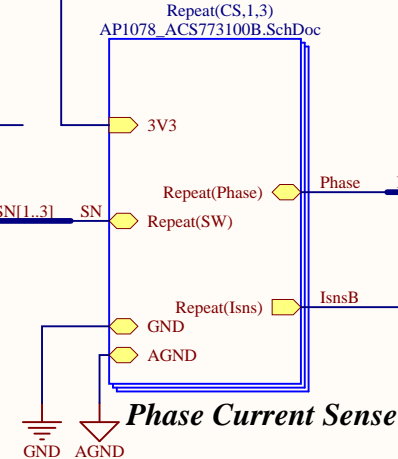
DC bus voltage sense



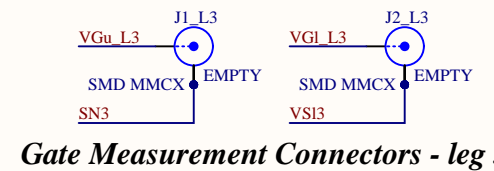
Gate Driver



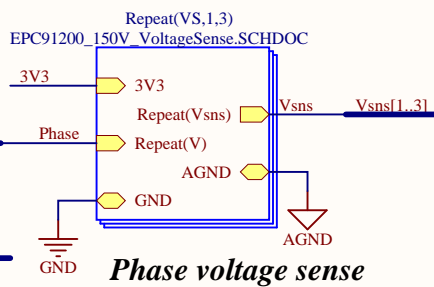
Phase Leg



Phase Current Sense



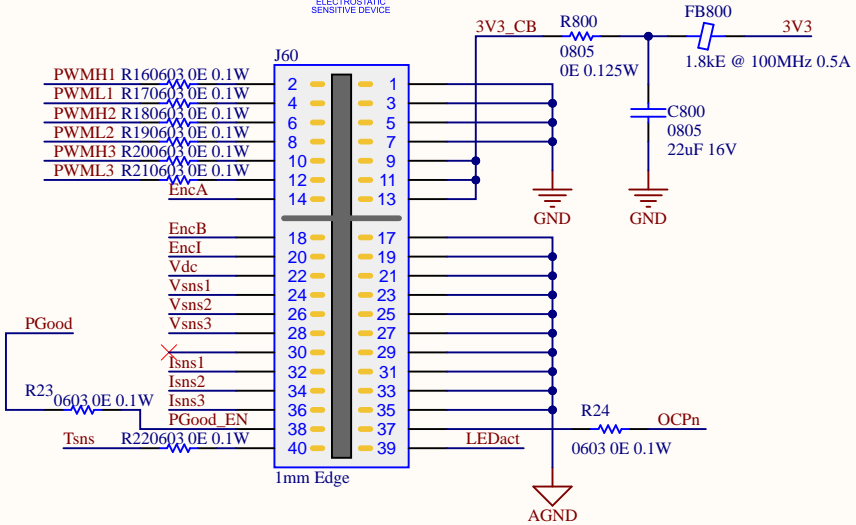
Gate Measurement Connectors - leg 3



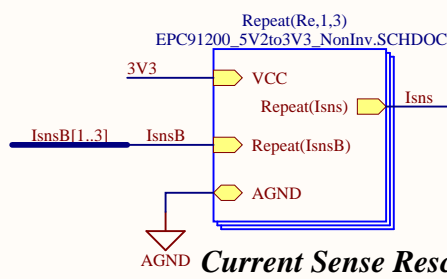
Phase voltage sense



ATTENTION ELECTROSTATIC SENSITIVE DEVICE



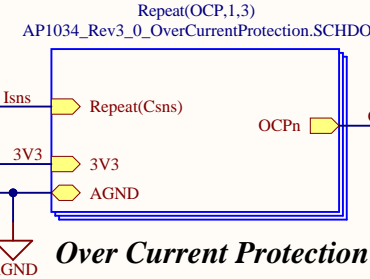
Control interface connector



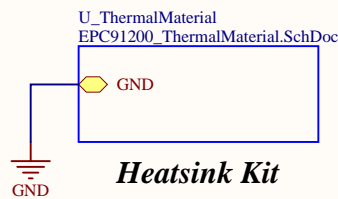
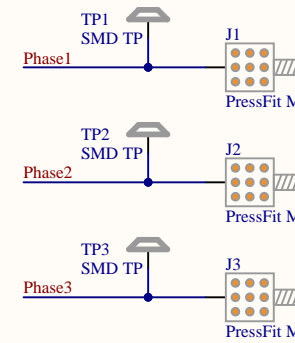
Current Sense Rescaling



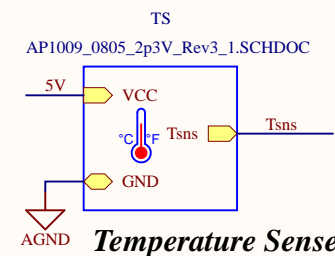
ATTENTION HOT SURFACE



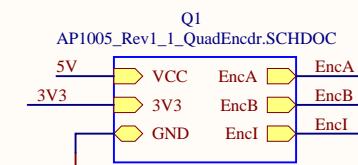
Over Current Protection



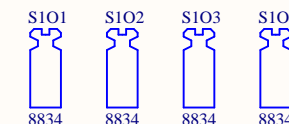
Heatsink Kit



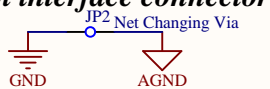
Temperature Sense



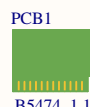
Shaft encoder input Quadrature with Index Supports optical and hall



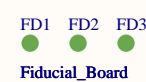
Nylon Standoff StandOffs




JP2 Net Changing Via

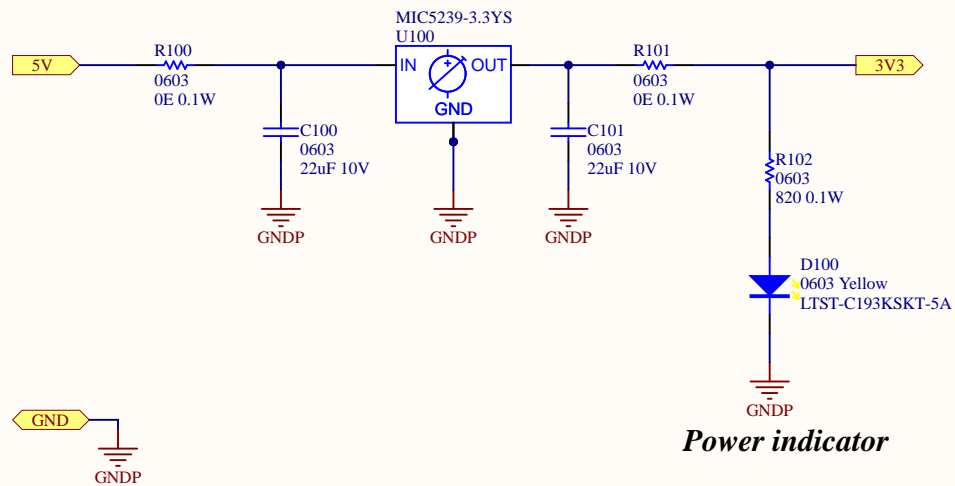


Serial# yyww-nnn




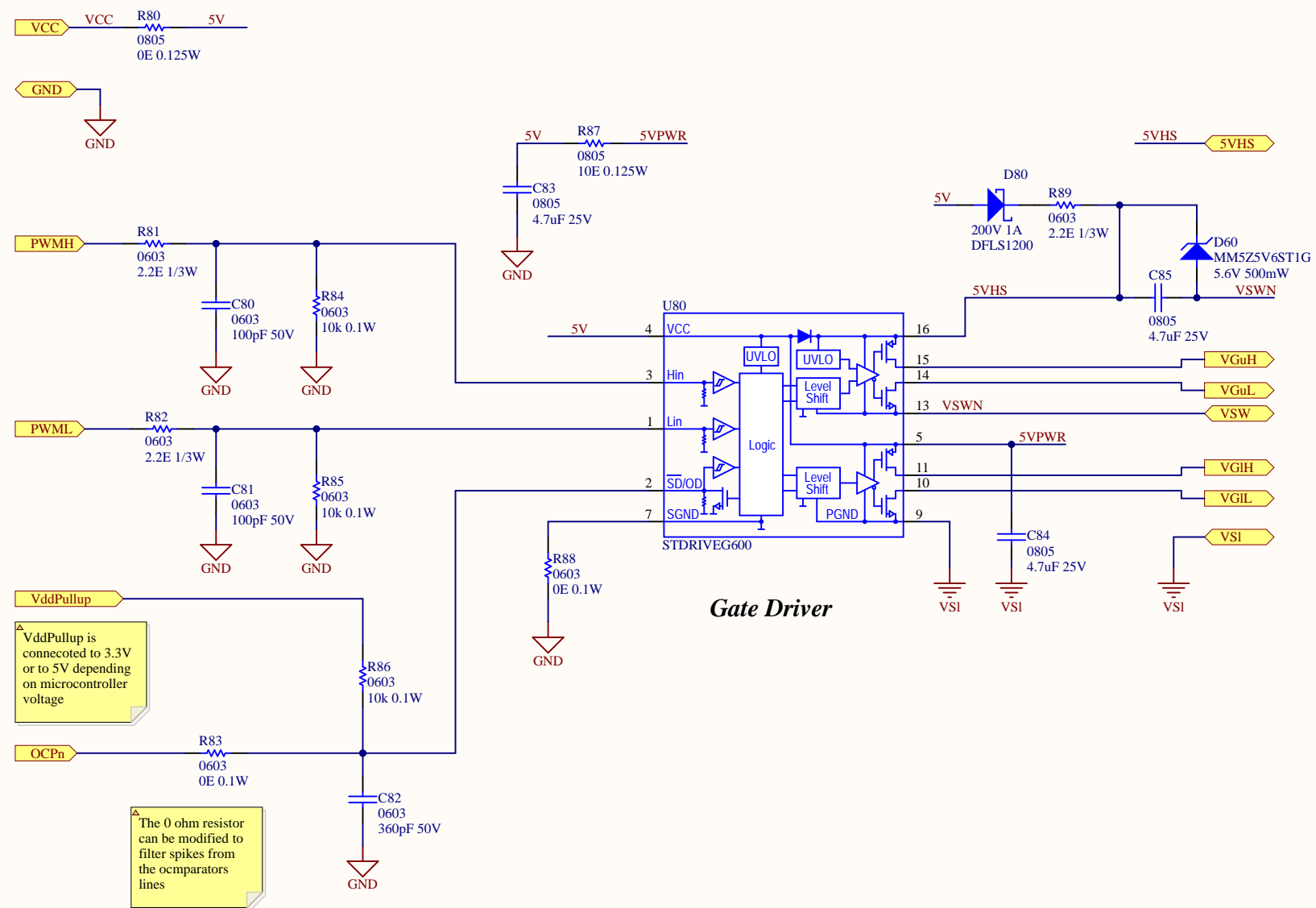
For evaluation only; not FCC approved for resale

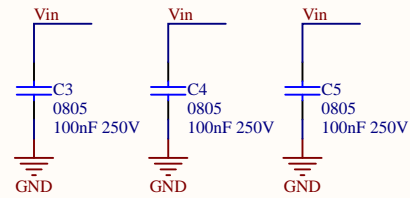
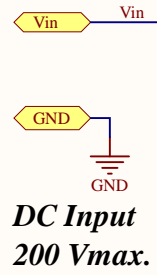
Title: Evaluation Schematic		© EPC 2024
Design #: EPC91200	PCB #: B5474	Efficient Power Conversion 909 Pacific Coast Hwy. Ste 230 El Segundo, CA 90245 U.S.A. www.epc-co.com 
Revision 1.1	Revision: 1.1	
Date: 9/5/2024	Sheet 1 of 14	
File: EPC91200_B5474_Rev1_1_Main.SCHDOC		



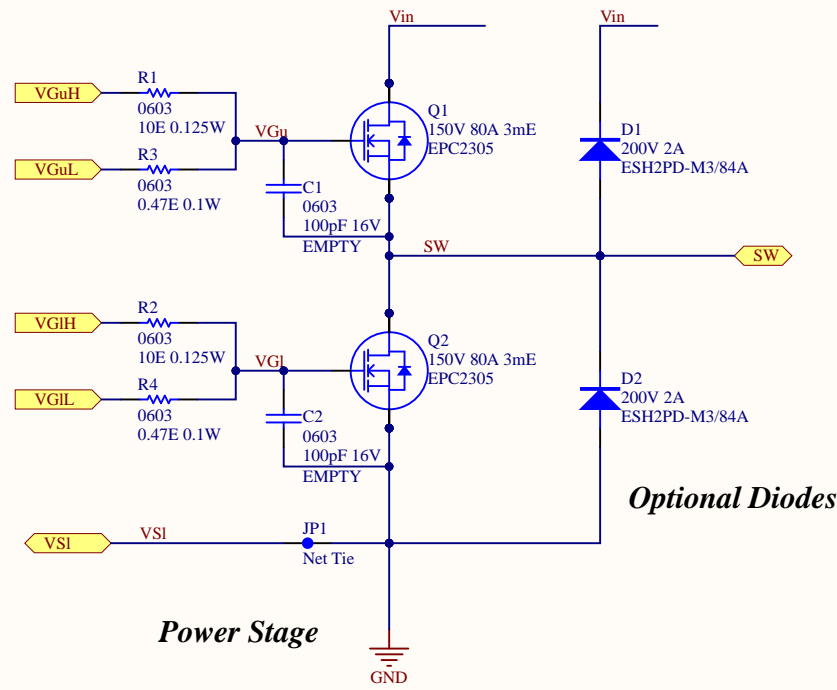
Power indicator

Title: 5V to 3V3 500mA LDO using MIC5239-3.3YS		© EPC 2024
Design #: AP1074		Efficient Power Conversion 909 Pacific Coast Hwy. Ste 230 El Segundo, CA 90245 U.S.A. www.epc-co.com 
Revision 1.0		
Date: 5/9/2024	Sheet 2 of 14	
File: AP1074_Rev1_0.SCHDOC		

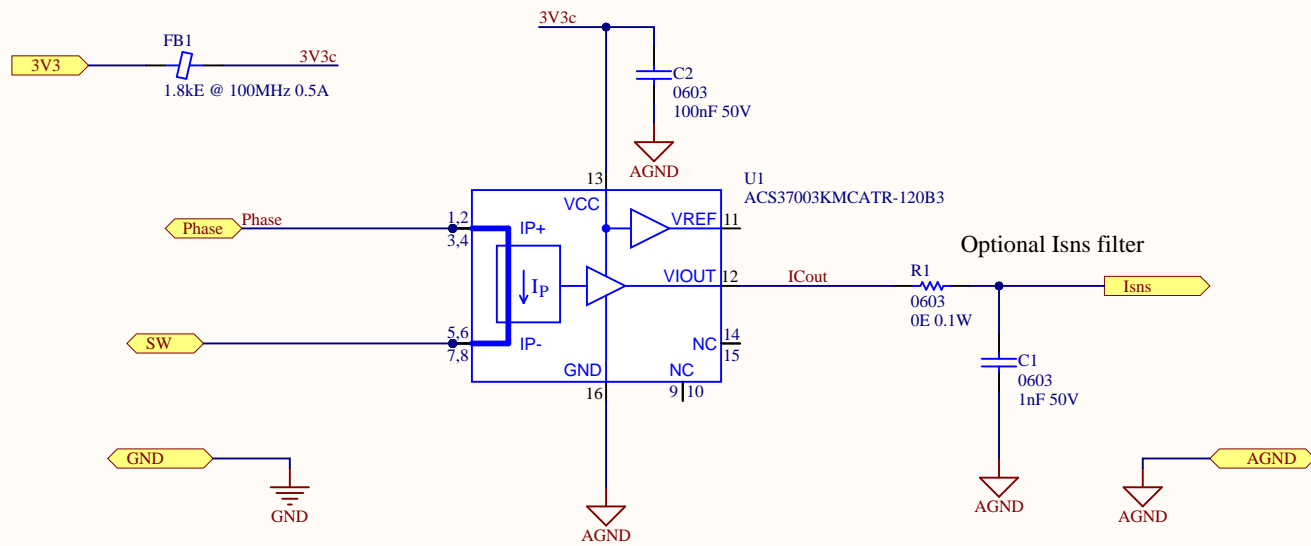




Decoupling Capacitors



Optional Diodes




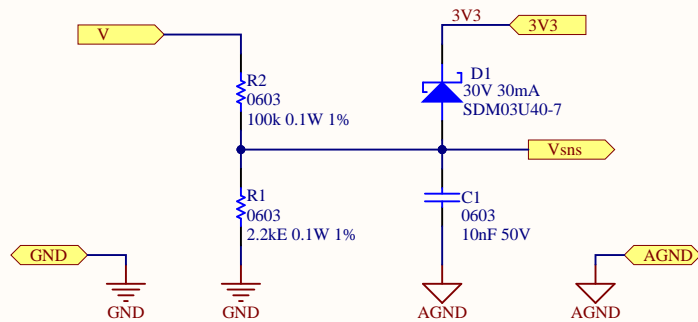
The polarity is intentionally inverted to comply with previous EPC motor drive inverter boards

Title: Bidirectional current sense using Hall effect sensor ACS773ECB-100B-PFF© EPC 2023	
Design #: AP1078	
Revision 1.0	
Date: 3/25/2024	Sheet 5 of 14
File: AP1078_ACS773100B.SchDoc	

Efficient Power Conversion


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 El Segundo, CA 90245
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www.epc-co.com

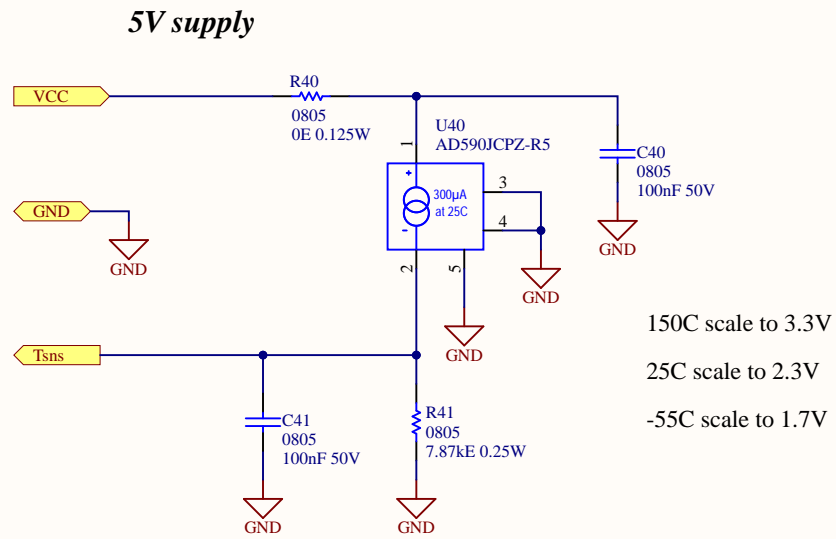





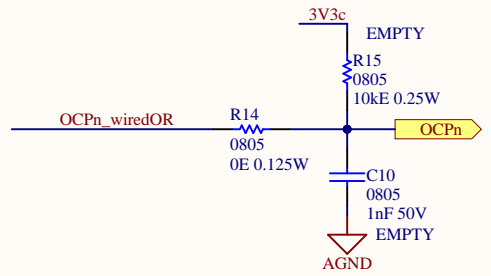
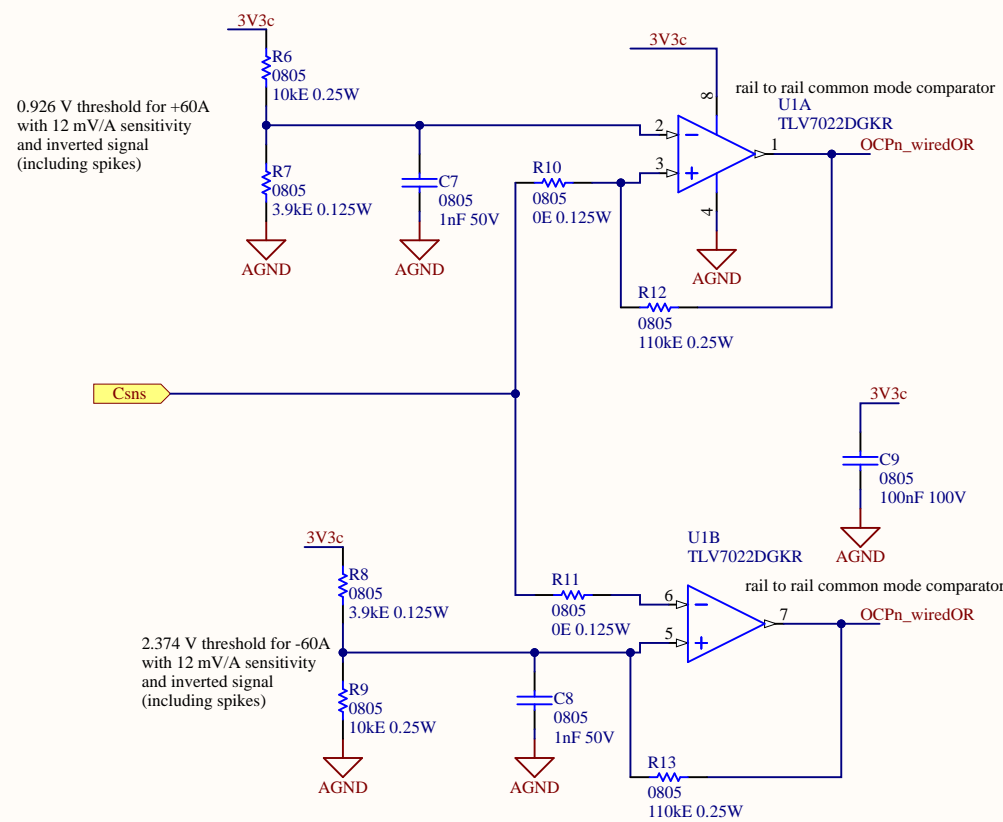
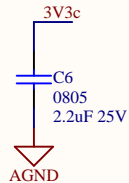
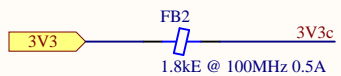
21.53 mV/V

153.3 V maximum readable voltage

Title: Sub Schematic		© EPC 2023
Design #: EPC9196_200V_VoltageSense		Efficient Power Conversion 909 Pacific Coast Hwy. Ste 230 El Segundo, CA 90245 U.S.A. www.epc-co.com 
Revision 1.0		
Date: 4/4/2024	Sheet 6 of 14	
File: EPC91200_150V_VoltageSense.SCHDOC		

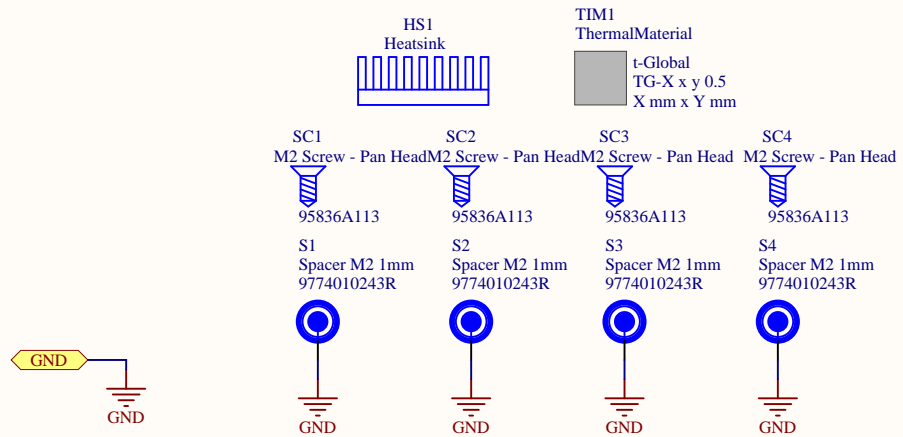



Title: Temperature sense using AD590 - 0805 components		© EPC 2023
Design #: AP1009_0805_2p3V		Efficient Power Conversion 909 Pacific Coast Hwy. Ste 230 El Segundo, CA 90245 U.S.A. www.epc-co.com 
Revision 3.1		
Date: 4/4/2024	Sheet 8 of 14	
File: AP1009_0805_2p3V_Rev3_1.SCHDOC		

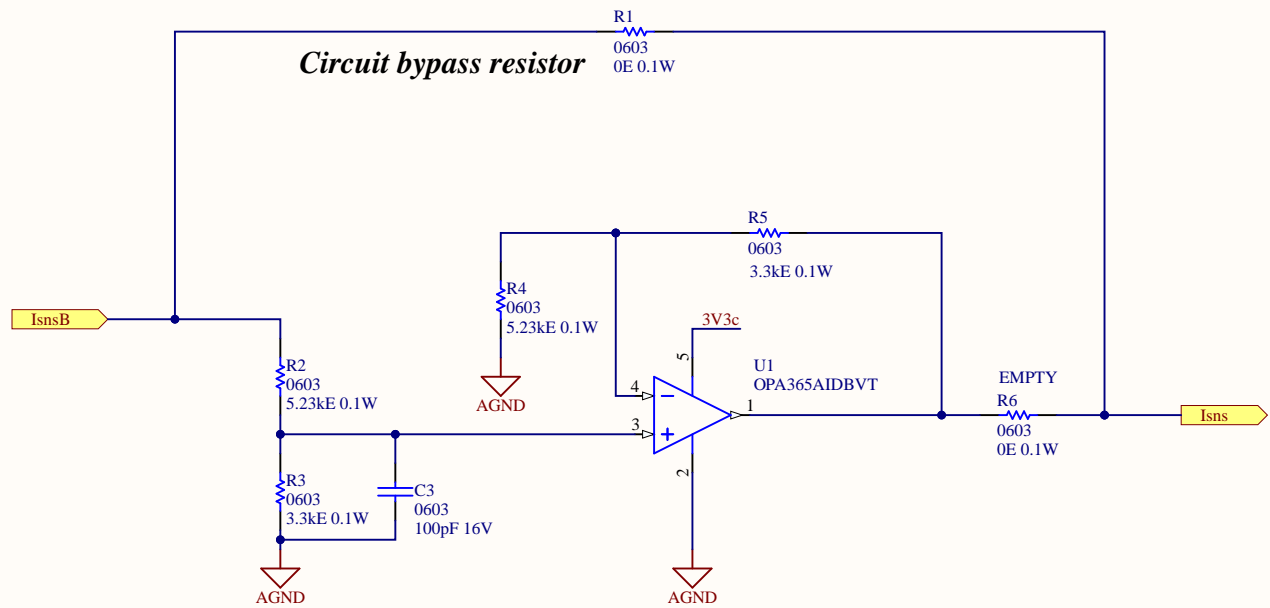
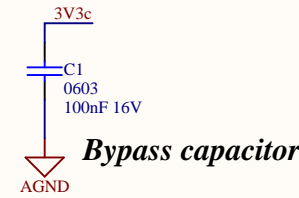
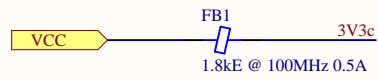


R12 and C9 are not mounted because they are mounted in front of the gate driver.

Title: Bidirectional Over Current detection		© EPC 2023
Design #: AP1034		Efficient Power Conversion 909 Pacific Coast Hwy. Ste 230 El Segundo, CA 90245 U.S.A. www.epc-co.com
Revision 1.1		
Date: 9/5/2024	Sheet 9 of 14	
File: AP1034_Rev3_0_OverCurrentProtection.SCHDOC		



Title: Thermal material for EPC9196		© EPC 2023
Design #: EPC9196_ThermalMaterial		Efficient Power Conversion 909 Pacific Coast Hwy. Ste 230 El Segundo, CA 90245 U.S.A. www.epc-co.com 
Date: 4/5/2024	Sheet 10 of 14	
File: EPC91200_ThermalMaterial.SCHDOC		



Three options:

- 1) Bypass: place R1 only, R6 EMPTY
- 2) Balanced amplifier: R2=R4, R3=R5; $V_{out}/V_{in} = R3/R2$. Choose R2 > 1kΩ to have HiZ input; R1 EMPTY
- 3) Voltage follower: R5=0Ω, R4=EMPTY, total gain is set by voltage divider R2,R3; R1 EMPTY

5V to 3.3V:

- 1) N/A
- 2) R2=R4=4.99kΩ; R3=R5=3.3kΩ
- 3) R5= 0Ω, R4=EMPTY, R2=1.69kΩ; R3=3.3kΩ

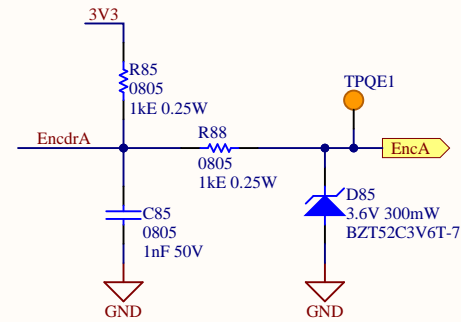
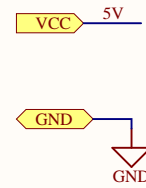
5.2V to 3.3V:

- 1) N/A
- 2) R2=R4=5.23kΩ; R3=R5=3.3kΩ
- 3) R5= 0Ω, R4=EMPTY, R2=1.91kΩ; R3=3.3kΩ

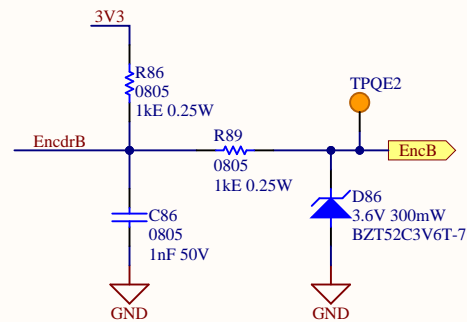
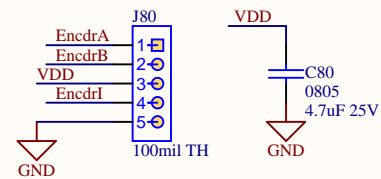
Title: 5V to 3.3 V scale current sense rescale		© EPC 2023	
Design #: AP1xxx		Efficient Power Conversion	
Revision 1.1		909 Pacific Coast Hwy. Ste 230	
Date: 4/5/2024	Sheet 11 of 14	El Segundo, CA 90245	
File: EPC91200_5V2to3V3_NonInv.SCHDOC		U.S.A.	
		www.epc-co.com	



A

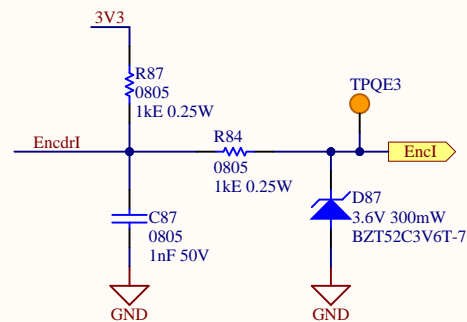
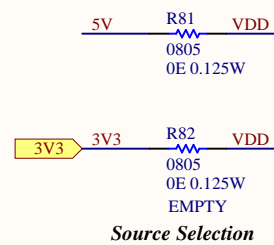


B



Shaft encoder connection
Quadrature with Index
Supports optical and hall

C

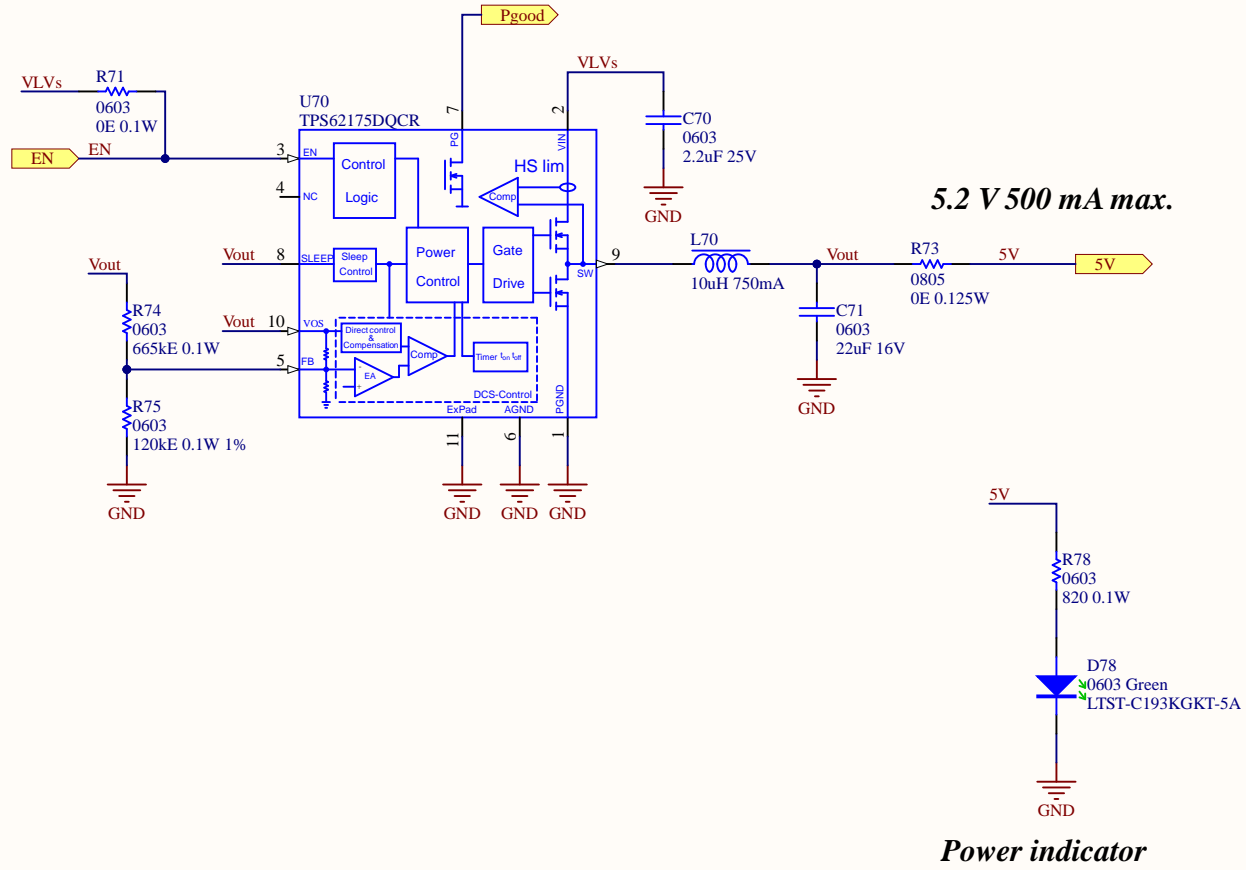
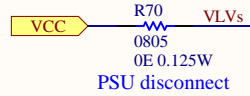


D

Quadrature Encoder Interface without 5V regulator

Title AP1005 Rev. 1.1		Efficient Power Conversion 909 N. Pacific Coast Hwy, Ste. 231 El Segundo, CA 90245 United States www.epc-co.com	
Size: A	*	Revision: 1	
Date: 2/1/2024		Sheet 12 of 14	
File: AP1005_Rev1_1_QuadEncdr.SCHDOC			

6 Vmin. to 28 Vmax.



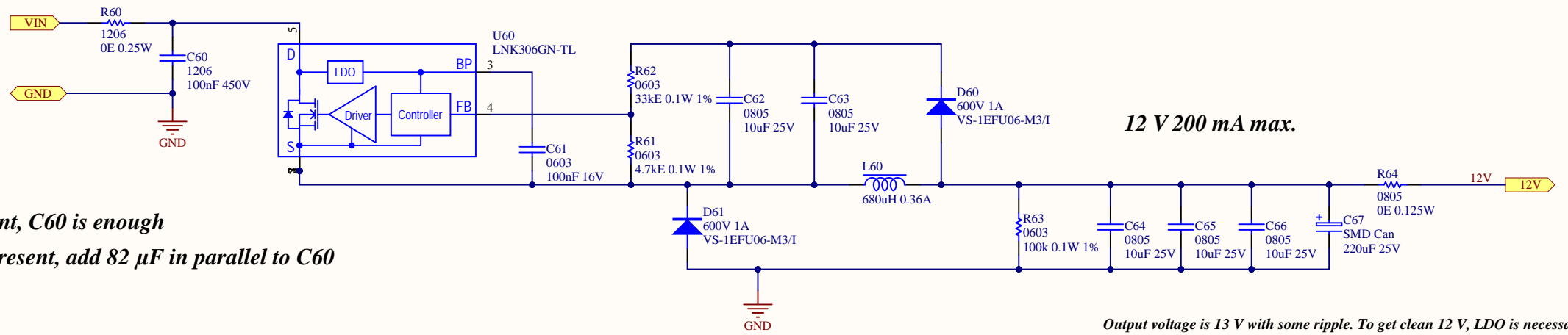
5.2 V 500 mA max.

Power indicator

Title: 28 V to 5.2 V Housekeeping Power Supply		© EPC 2024
Design #: AP1043_5V2_0603		Efficient Power Conversion 909 Pacific Coast Hwy. Ste 230 El Segundo, CA 90245 U.S.A. www.epc-co.com
Revision 1.0		
Date: 5/9/2024	Sheet 13 of 14	
File: AP1043_5V2_0603.SCHDOC		



400 V max



12 V 200 mA max.

When DC bus capacitors are present, C60 is enough
 When DC bus capacitors are not present, add 82 μ F in parallel to C60

Output voltage is 13 V with some ripple. To get clean 12 V, LDO is necessary

