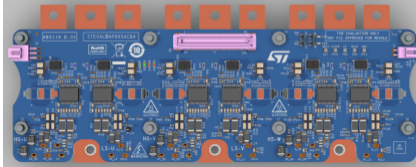


ASIL D gate driver board for traction inverter in EV/ HEV applications



The picture shown is for illustration purpose only.
Actual product may vary depending on buyer's selection and availability.

Features

- 12 V input voltage
- New motor control connector for supporting 3-phase motors, six phase, and externally excited synchronous motors (EESM)
- Galvanically isolated driving stage with L9502E for ASIL D applications
- Fully optimized for dual side cooling power module in half bridge topology (ADDH900120W3) based on SiC technology
 - Protection functions such as the miller clamp, desaturation detection, hybrid turn-off (HTO), UVLO, and OVLO
 - Layout optimized with minimized stray inductances
 - High reliability and robustness

Description

The **STEVAL-APD05ACB** is an evaluation board evaluating the dual side cooling power module in half bridge topology ADDH900120W3 for automotive powertrain applications.

It offers the best performance in terms of power density, form factor and reaching power level up to 300 kW with a proper cooling system.

The **STEVAL-APD05ACB** contains two main blocks: driving section and diagnostic of the driving circuitry and the connectors for the power supply section.

The driving section, hosting mainly the driver **L9502E** with flyback controller integrated to generate the driving voltages (+18/-5V) with high current capability (up to 15A).

Diagnostic of the driving circuitry and the connectors for the power supply section. This board can be connected to the power module by a press fit insertion tool (design available).

The control section is not included but can be separately ordered, choosing the **STEVAL-TTM007A**.

The **STEVAL-TTM007A** hosts the **SR5E1E7** (eTQFP176) which is a 2x 32-bit Arm® Cortex® -M7 with double precision FPU, L1 cache and DSP instructions with two cores in parallel or one core in lockstep configuration.

The PMIC **SPSB100** is available for a configurable multioutput voltage for highly integrated processors.

The **SR5E1E7** and the **SPSB100** offer the best performance thanks to dedicated peripherals for motor control.

A double and redundant signal conditioning, for reading the resolver feedback, has been included to guarantee the implementation of the most advanced field-oriented control algorithms.

ST can also offer a companion kit including an HV DC bus cap with bus bar and a suitable cooler to meet the system requirements and to quickly evaluate the products.

Please contact ST office asking for this custom-built solution.

Product summary	
ASIL D gate driver board for traction inverter in EV/ HEV applications	STEVAL-APD05ACB
SR5 E1 line of Stellar electrification MCUs, 32-bit Arm Cortex-M7 automotive MCU 2x cores, 2 MB Flash, rich analog, high-resolution timer, HSM, ASIL-D	SR5E1E7
Applications	Automotive Motor Control

1 Schematic diagrams

Notice: These schematics are for illustration purpose only. Actual product may vary depending on buyer's selection and availability.

Figure 1. STEVAL-APD05ACB circuit schematic (1 of 10)

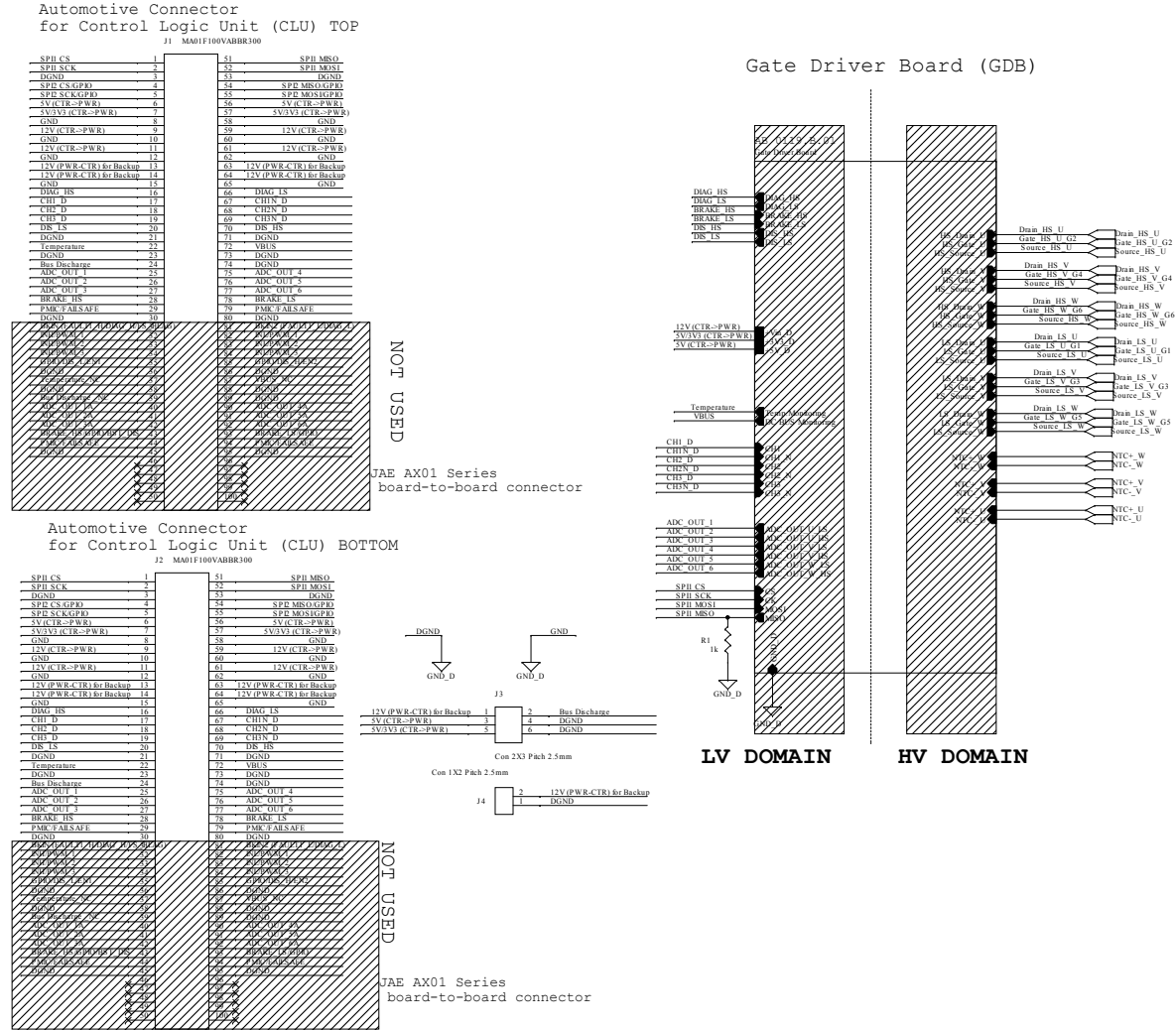


Figure 2. STEVAL-APD05ACB circuit schematic (2 of 10)

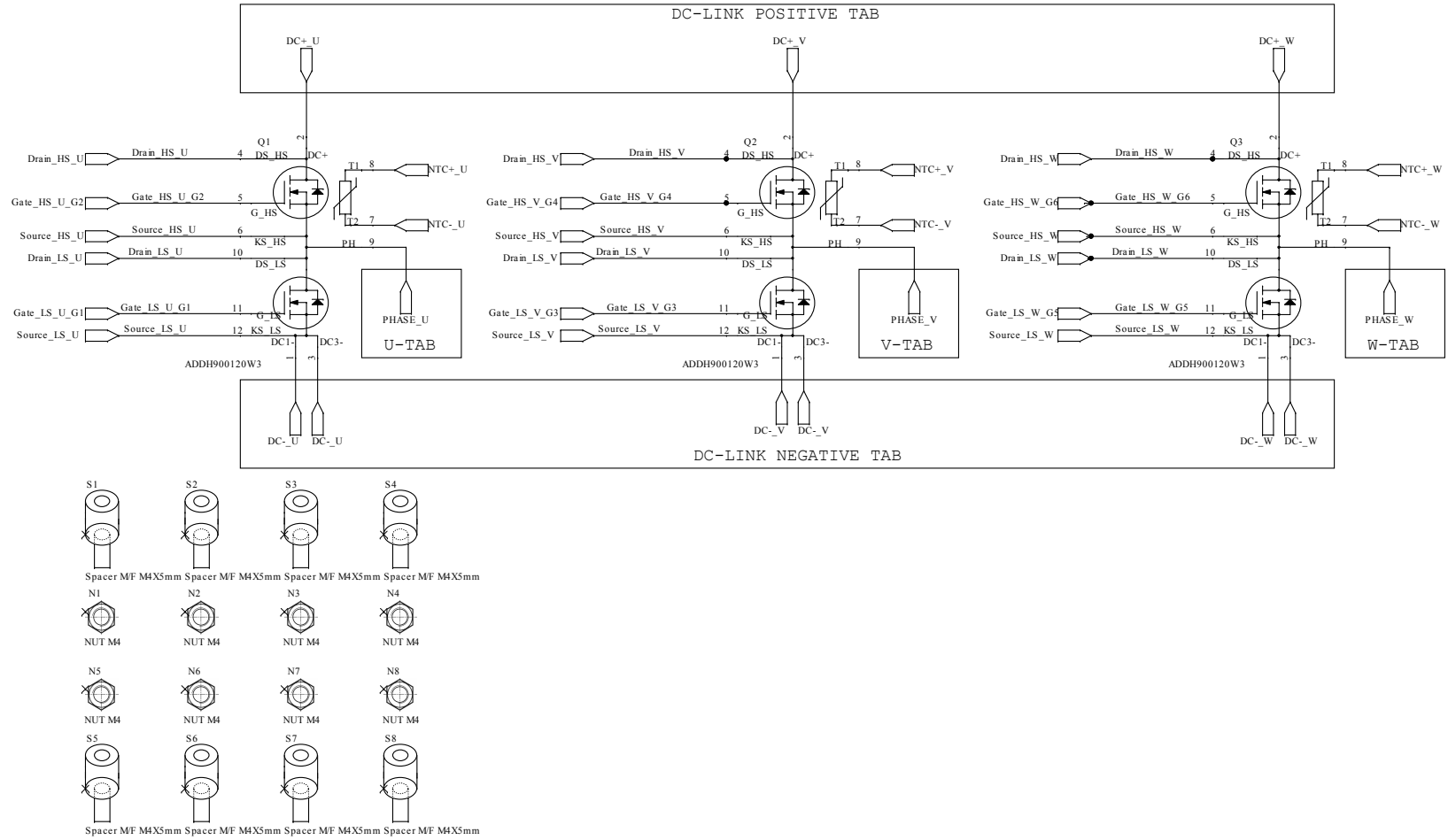


Figure 3. STEVAL-APD05ACB circuit schematic (3 of 10)

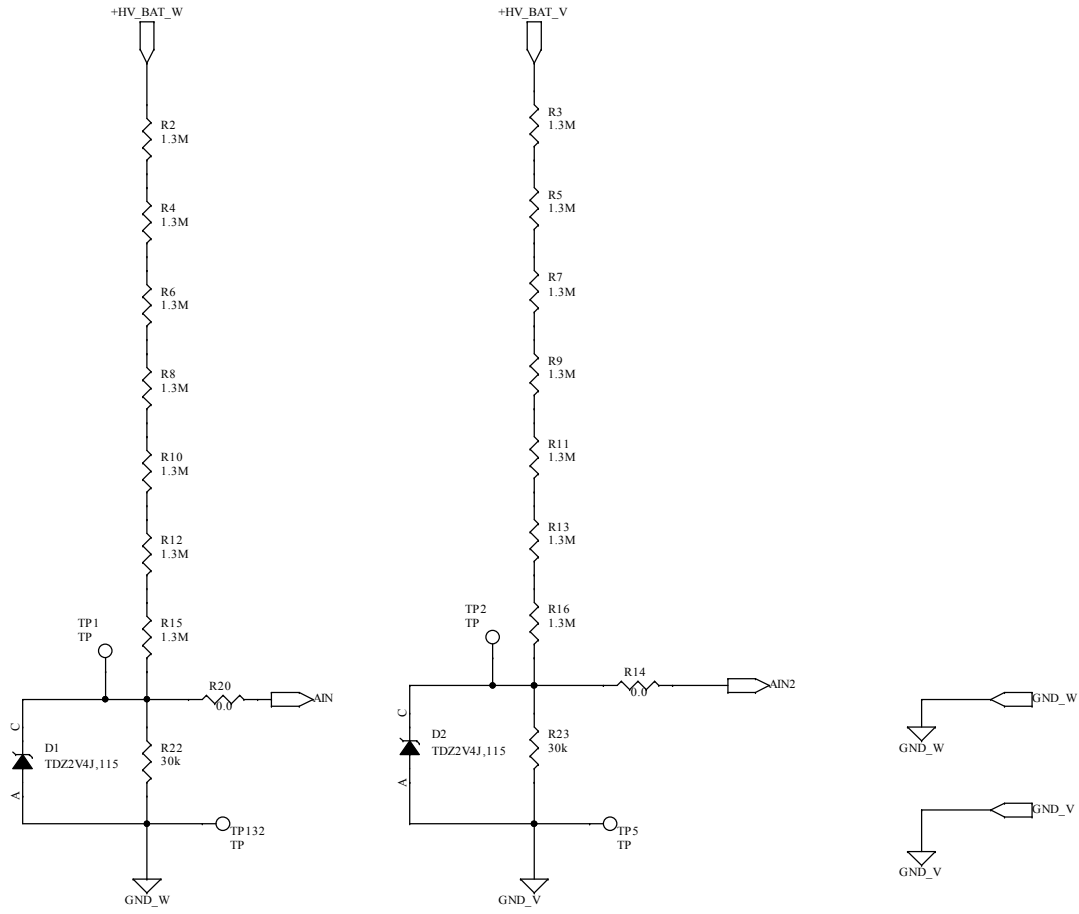


Figure 4. STEVAL-APD05ACB circuit schematic (4 of 10)

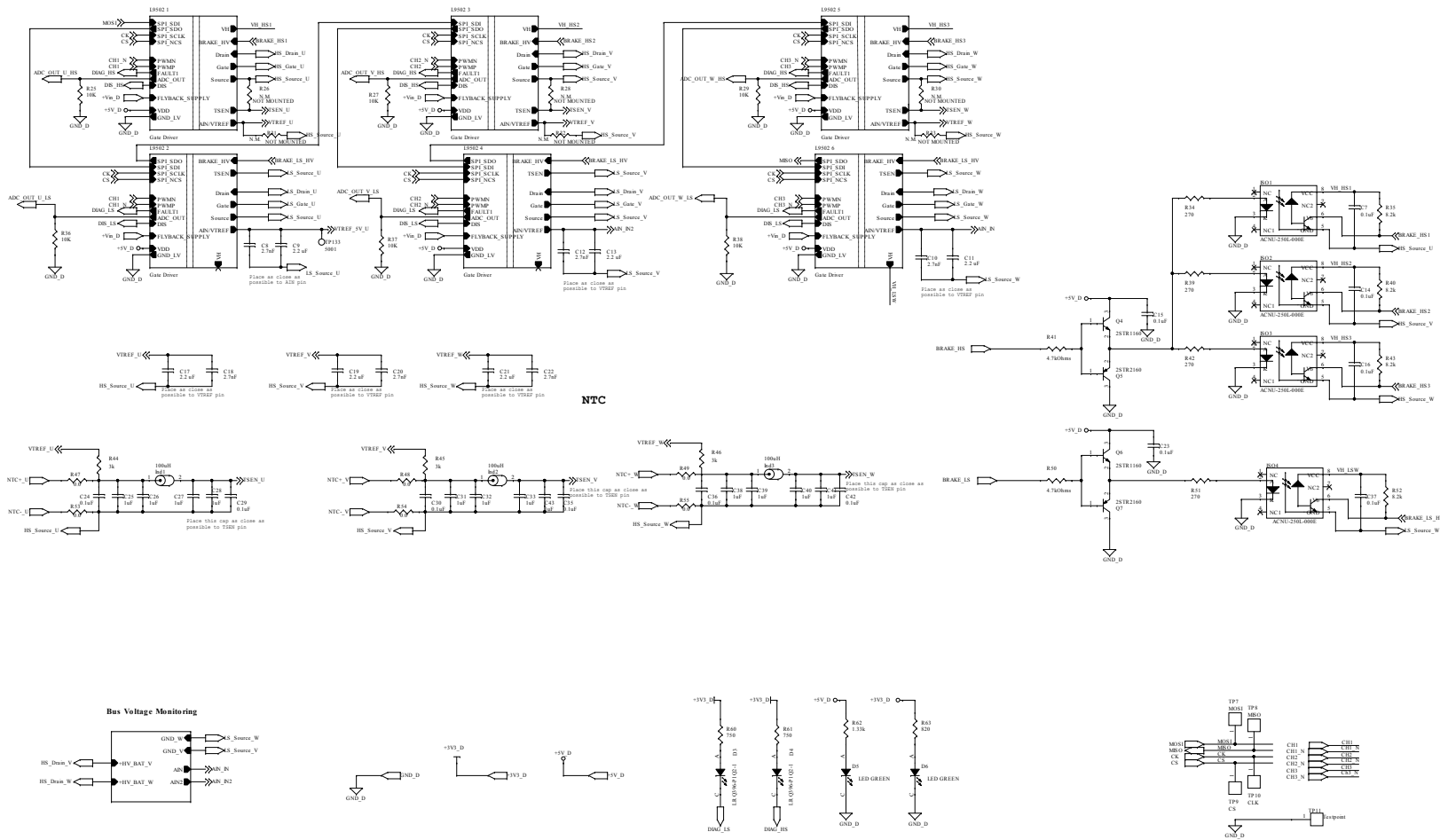
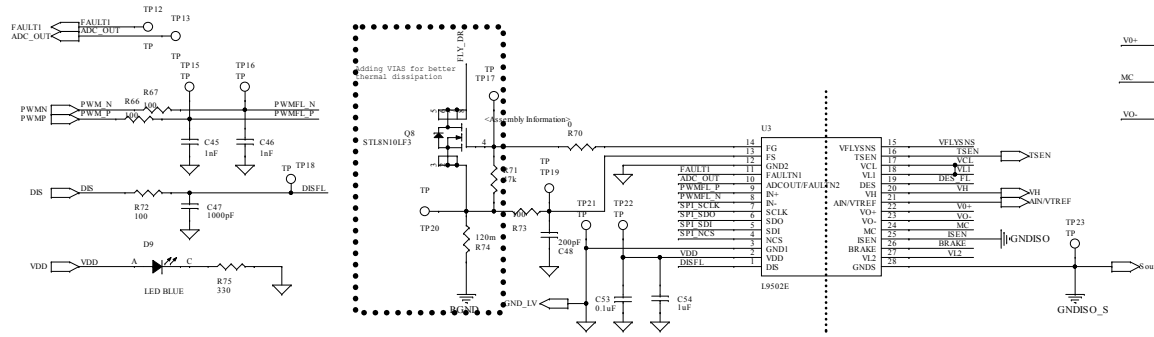
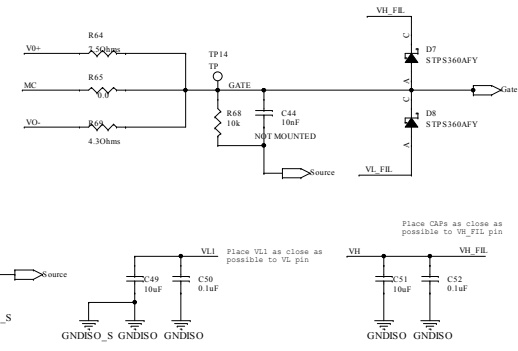


Figure 5. STEVAL-APD05ACB circuit schematic (5 of 10)

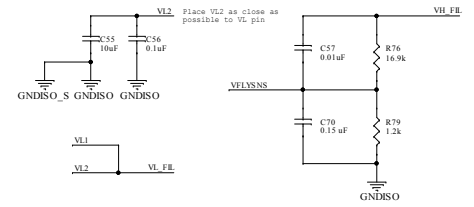
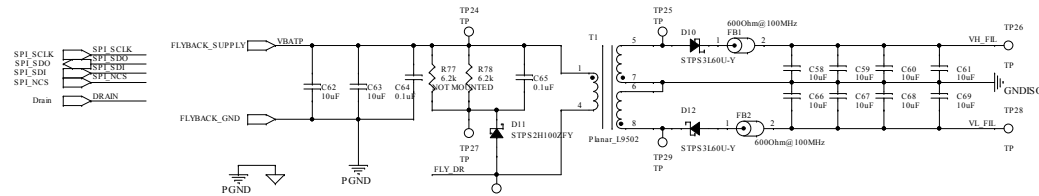
L9502 Gate Driver



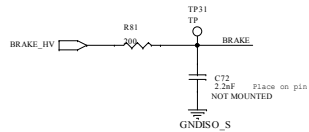
GATE RESISTOR



FLYBACK SECTION



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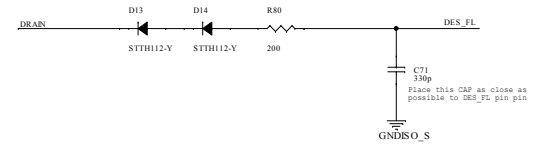
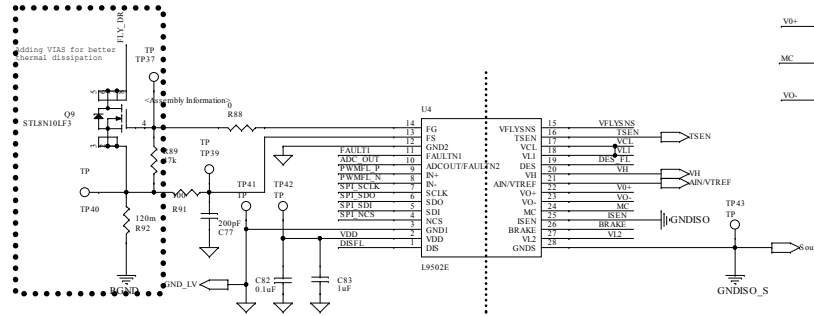
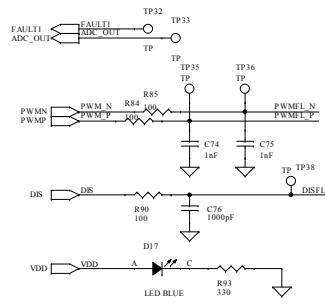
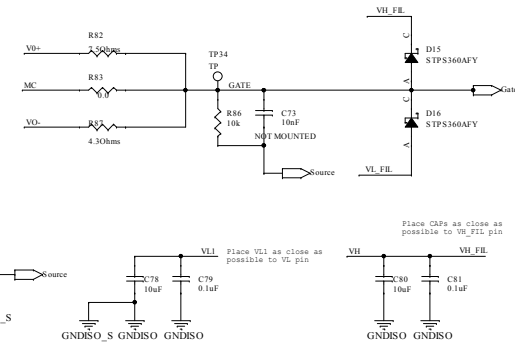


Figure 6. STEVAL-APD05ACB circuit schematic (6 of 10)

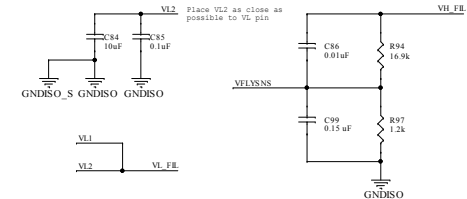
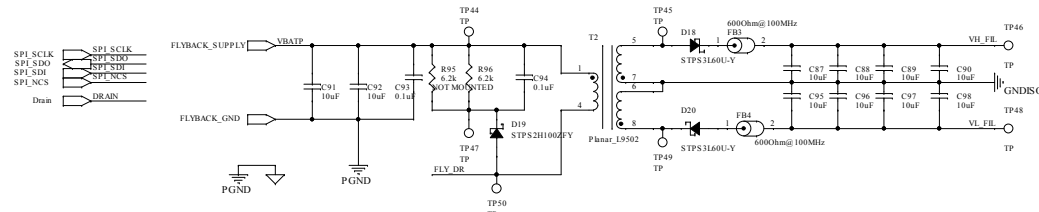
L19502 Gate Driver



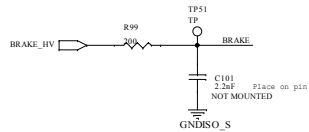
GATE RESISTOR



FLYBACK SECTION



BRAKE

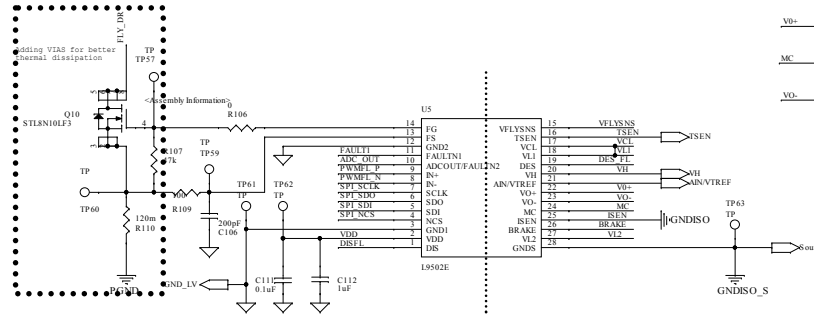
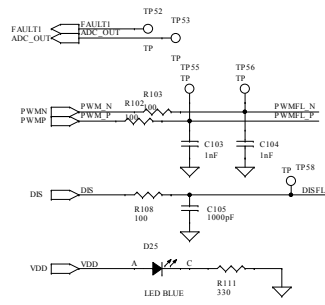


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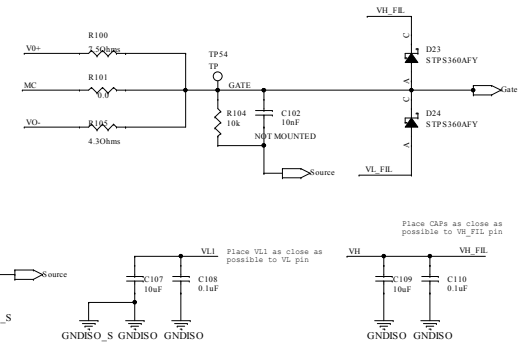


Figure 7. STEVAL-APD05ACB circuit schematic (7 of 10)

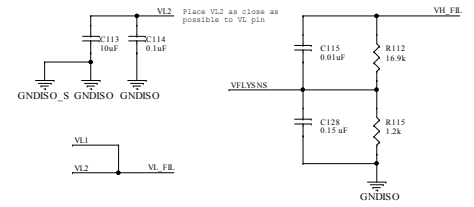
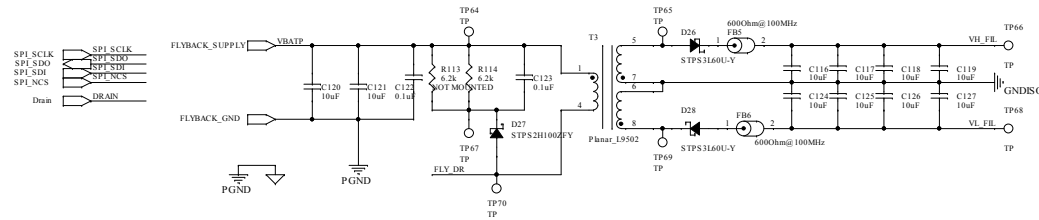
L9502 Gate Driver



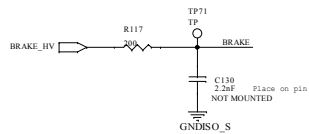
GATE RESISTOR



FLYBACK SECTION



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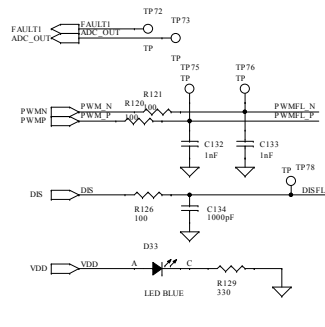


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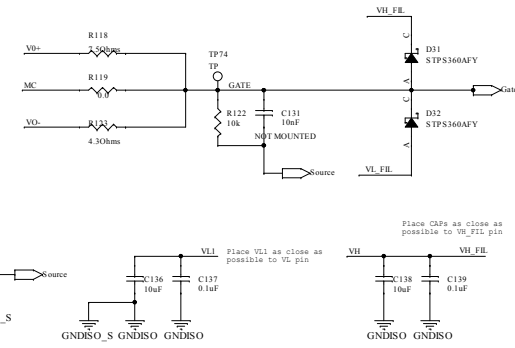


Figure 8. STEVAL-APD05ACB circuit schematic (8 of 10)

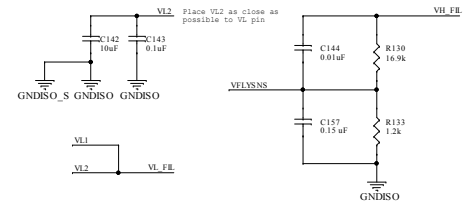
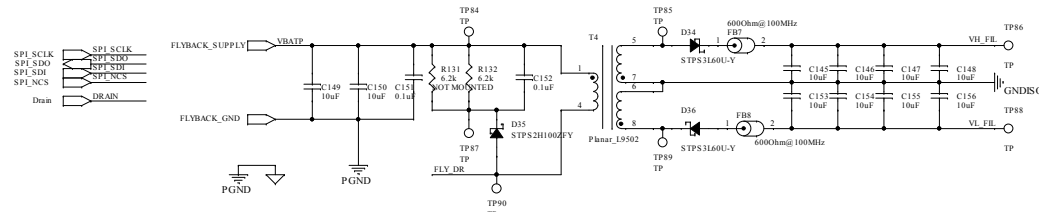
L9502 Gate Driver



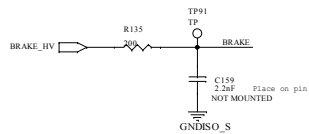
GATE RESISTOR



FLYBACK SECTION



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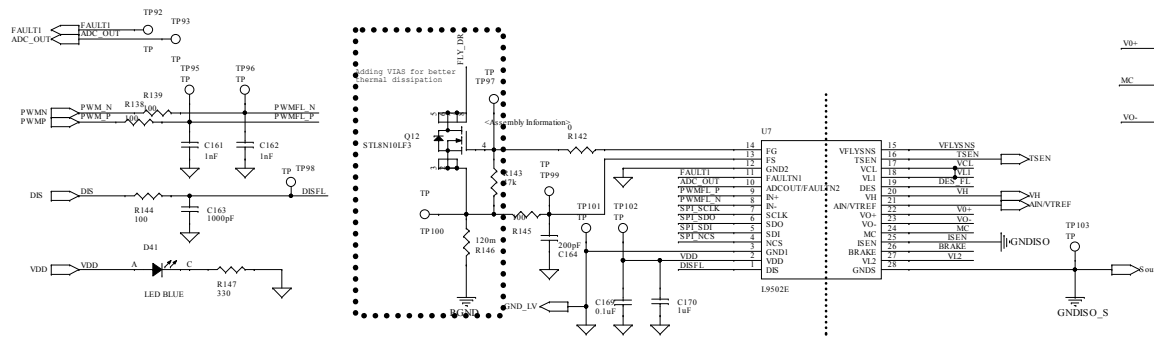


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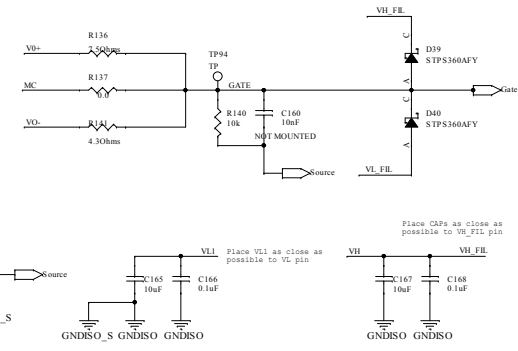


Figure 9. STEVAL-APD05ACB circuit schematic (9 of 10)

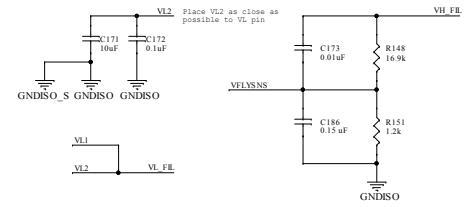
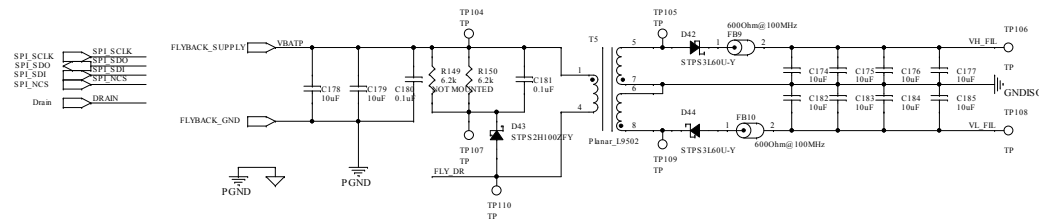
L9502 Gate Driver



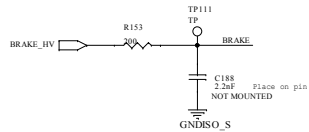
GATE RESISTOR



FLYBACK SECTION



BRAKE



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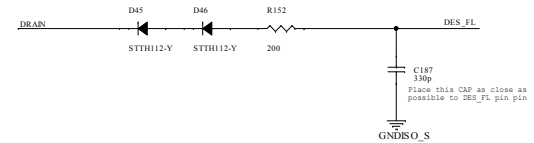
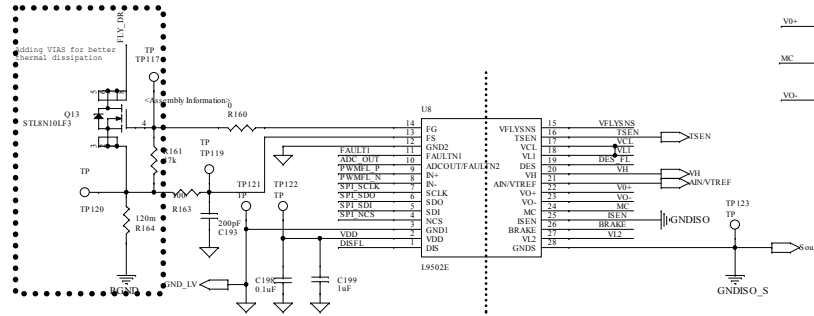
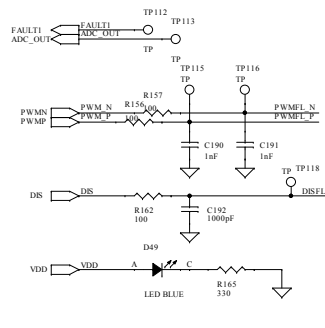
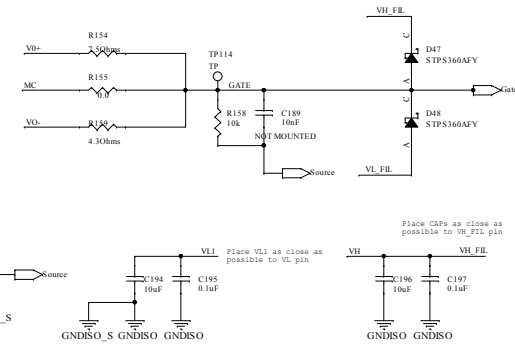


Figure 10. STEVAL-APD05ACB circuit schematic (10 of 10)

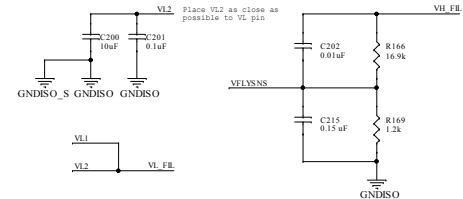
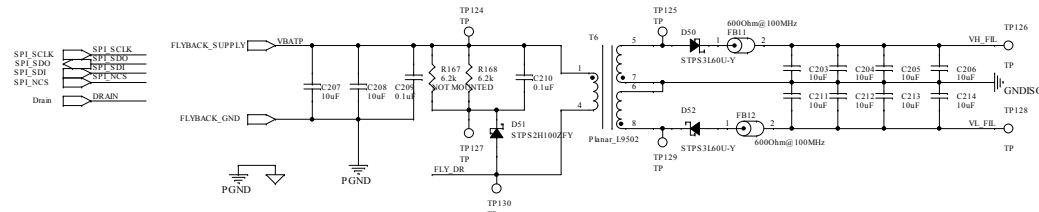
L9502 Gate Driver



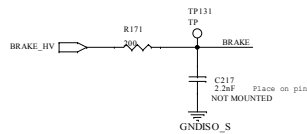
GATE RESISTOR



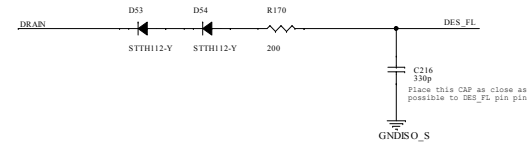
FLYBACK SECTION



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2 Custom evaluation boards information

Notice: These evaluation boards are custom designed and built, in small quantities, according to specific requests from customers and are destined for evaluation and testing of ST products in a research and development setting. Please contact ST to provide your specific requests and get your custom built board(s).

Revision history

Table 1. Document revision history

Date	Revision	Changes
15-Oct-2024	1	Initial release.

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