

Module

Randomm

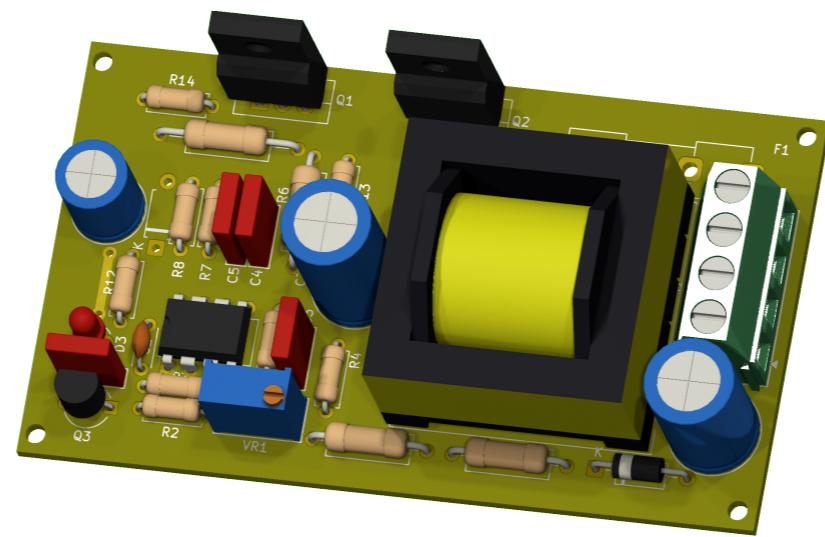
Variant: CHECKED

Rev + (Unreleased)

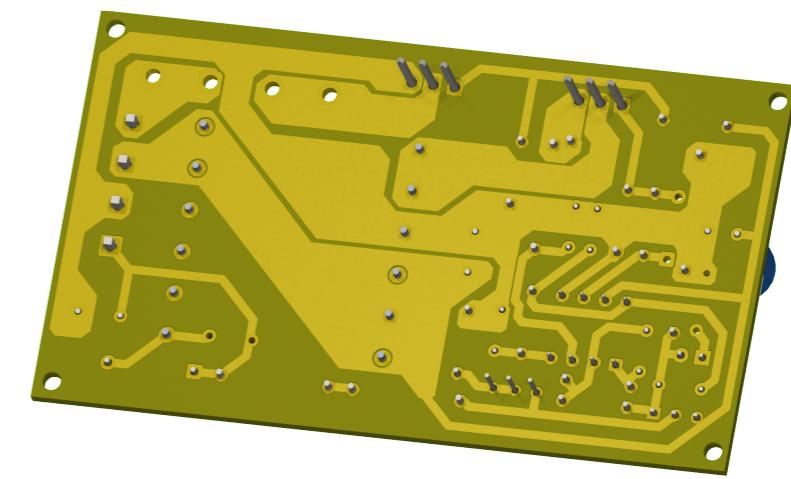
2025-12-19

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TOP VIEW



BOTTOM VIEW



NOTES

Comment

Not fitted components are marked as

DRAFT - Early concept stage, schematic drafted.

PRELIMINARY - Minor schematic changes are expected, ready for layout planning.

CHECKED - DRC completed, schematic and layout ready for review.

RELEASED - Design ready for manufacturing.

Date: 19-Dec-2025

DESIGN CONSIDERATIONS

DESIGN NOTE:
Example text for informational design notes.

DESIGN NOTE:
Example text for debug notes.

DESIGN NOTE:
Example text for cautionary design notes.

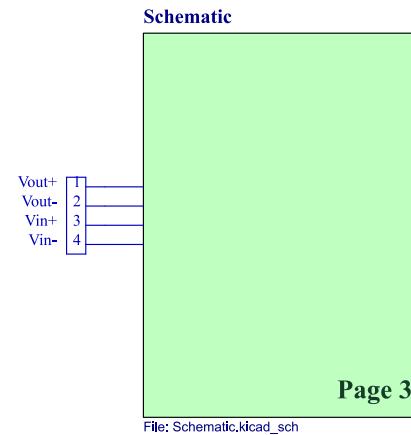
DESIGN NOTE:
Example text for critical design notes.

LAYOUT NOTE:
Example text for critical layout guidelines.

	Comments:	Company: FR	Variant: CHECKED	Git Hash: 8249b61
	Board Name: Module	Project Name: Step-up module 12:450 V		
	Sheet Title:	File Name: StepUp_module_12to450V.kicad_sch	Designer: FR	Date: 2025-01-12 Revision: + (Unreleased)
	Sheet Path:	/	Reviewer: NA	Size: A3 Sheet: 1 of 4

[2] Block Diagram

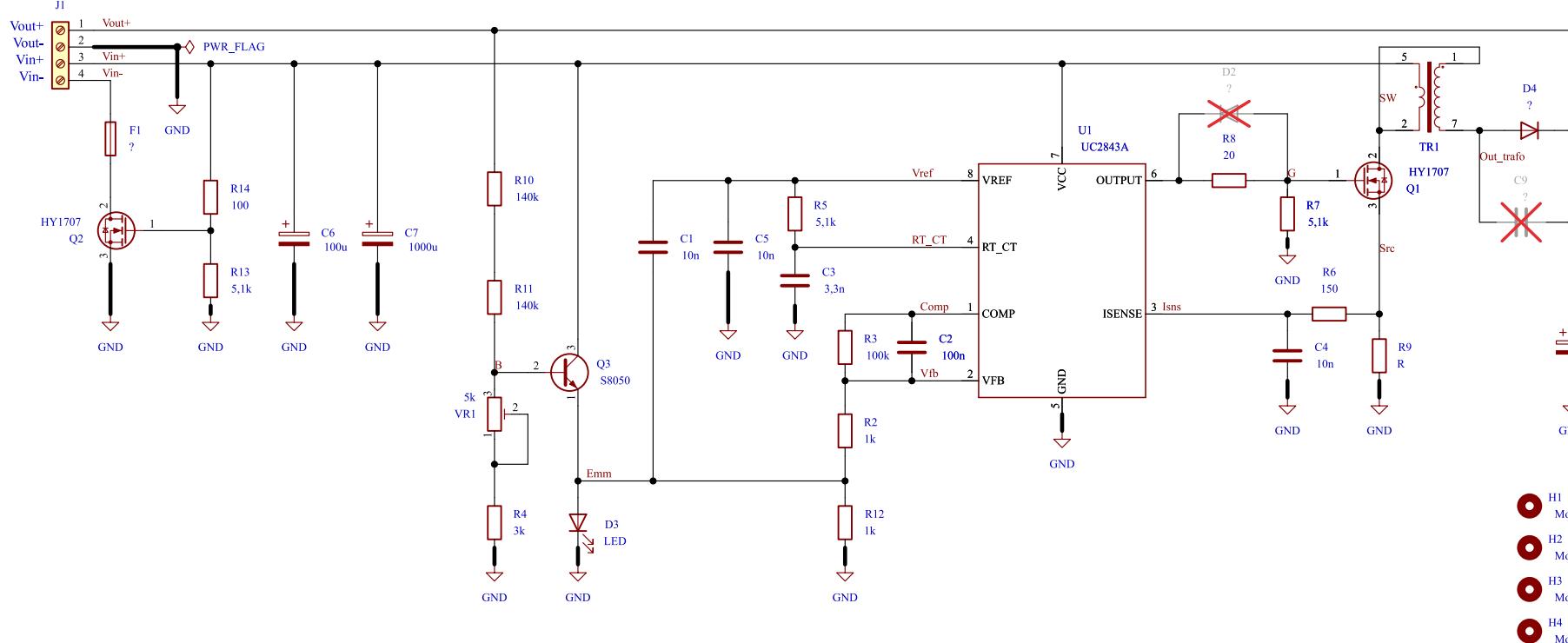
MODULE INTERFACE:
 Vin: 9 V to 2 V according to
 AliExpress product page
 Vout: 200 V to 450 V,
 adjustable through VR1



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	Comments: AliExpress module	Company: FR	Variant: CHECKED	Git Hash: 8249b61
	Board Name: Module			Project Name: Step-up module 12:450 V
	Sheet Title: Block Diagram	File Name: Block Diagram.kicad_sch	Designer: FR	Date: 2025-01-12 Revision: + (Unreleased)
	Sheet Path: /Block Diagram/		Reviewer: NA	Size: A4 Sheet: 2 of 4

[3] Schematic



Comments:	Company:	Variant:	Git Hash:
FR	Module		
Board Name:	Project Name:		
Sheet Title:	File Name:	Designer:	Date: Revision:
Schematic	Schematic.kicad_sch	FR	2025-01-12 + (Unreleased)
Sheet Path:	Reviewer:		
/Block Diagram/Schematic/	NA		

[4] Revision History

A

Version 1.0.0 - 2023-12-12

- Added**
- TVS protection and termination switch to FD-CAN.
 - Low-side switched 12V 600 mA source for external fan.
 - LDO for analog supply.
 - One TVS diode per power connector.
 - Second on-board I2C magnetic encoder for disambiguation.
 - ESD protection to all interfaces.
 - Over-voltage protection on thermistor ADC inputs.
 - Pi filters to inputs of buck regulators and MCU analog supply.
 - Decoupling caps next to power pins of connectors.

B

Changed

- CPH-CPL capacitor to 47 nF (gate driver).
- FD-CAN transceiver IC.
- FETs for top cooled variant.
- Input power TVS diode to bidirectional.
- Moved SOx low-pass filter to MCU section.
- PWM_PHASEA with PWM_PHASEC on STM32G474 pinout for easier routing.
- RS422 pinout on connector.
- Buck regulators to optimize for low noise.

Version 1.0.1 - 2024-01-25

- Added**
- Controller target specifications.
 - Credits to moteus on cover page.
 - Optional RC-Snubber to power stage.

Fixed

- Chassis guard ring to go around the board.
- CAN and power TVS diodes now go to chassis.
- Clearance between nets to respect IEC60664-1 where possible.
- Comment on precharge.
- Power TVS diode reference designator from "U" to "D".

Changed

- 5V 300 mA buck converter with 600 mA version.
- Chassis-GND capacitor by 1nF 1kV.

Version 1.0.2 - 2024-03-12
Changed

- Power sequencing graph according to experimental data.

Version 1.1.0 - 2024-04-13
Added

- RC snubber passive values.

Fixed

- More vias for VBUS and LMR36006 GND pads.
- Board version voltage reference from +3V3 to +A3V3.

Changed

- Motor thermistor resistor divider to 2kOhm for a 10k 3950K thermistor.

C

D

	Comments: "Comment 1" "Comment 2" "Comment 3" "Comment 4"	Company: FR	Variant: CHECKED	Git Hash: 8249b61
	Board Name: Module			Project Name: Step-up module 12:450 V
	Sheet Title: Revision History	File Name: Revision History.kicad_sch	Designer: FR	Date: 2025-01-12
	Sheet Path: /Revision History/		Reviewer: NA	Size: A4 Sheet: 4 of 4