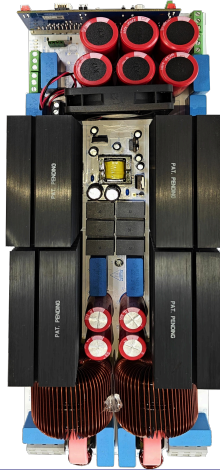


10 kW multi-level converter with dual channel MPPT



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

Features

- MPPT range: 280/450V – 850 V array input
- Output power (nominal): 7/10kW
- Output voltage (nominal): 400/800V
- Efficiency > 99% peak, 98.5% full power
- Input voltage disconnect: <400/250V
- Two channels or parallel configuration
- Comprehensive safety mechanisms

Description

The **STEVAL-10MLPVCB** is a 10 kW multilevel buck/boost converter with MPPT evaluation system.

It is based on a three-level power stage that is configured using flying capacitors and SiC 650 V MOSFETs in buck/boost mode.

In buck mode, the input voltage range is 425-850 V and the nominal output voltage is 400 V, with active current sharing on a common 400 V dc bus for feeding the battery bank or an inverter.

The same evaluation board can function as a boost mode with a nominal output voltage of 800 V and an input voltage range of 250-800 V by changing a few resistors in hardware and firmware for boost operation.

The **STEVAL-10MLPVCB** includes dual independent input channels and achieves a peak power conversion efficiency of > 99% using a perturb and observe MPPT algorithm.

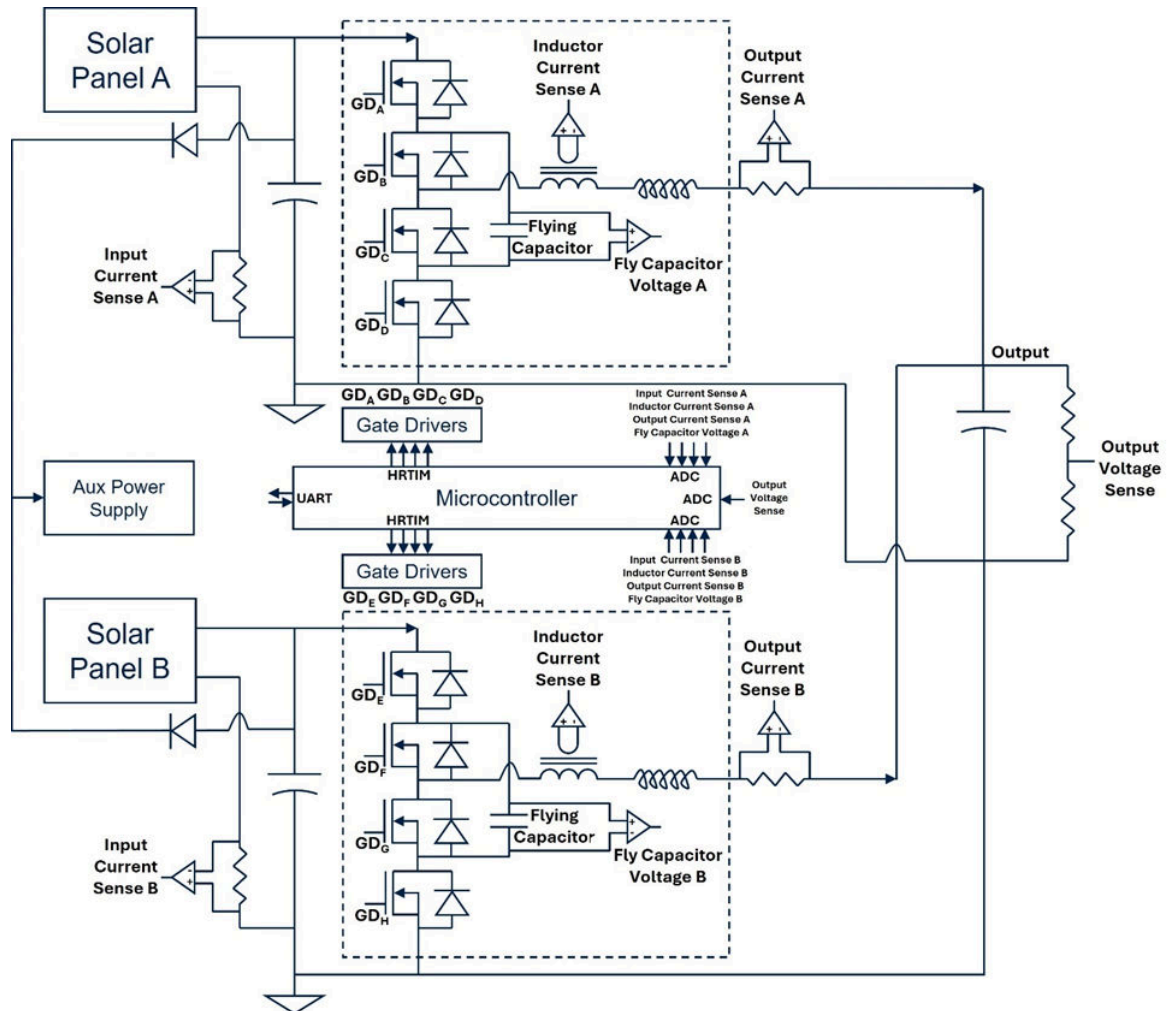
A single 32-bit **STM32G474RE** Arm MCU controls MPPT, dual-channel conversion, flying capacitor balancing, output regulation and protection mechanisms.

The evaluation board is targeted at renewable and energy storage applications.

Product summary	
10 kW multi-level converter with dual channel MPPT	STEVAL-10MLPVCB
Automotive-grade silicon carbide Power MOSFET 650 V, 40 mOhm typ., 30 A in an H2PAK-7 package	SCT040H65G3AG
Galvanically isolated 4 A single gate driver	STGAP2SM
Mainstream Arm Cortex-M4 MCU 170 MHz with 512 Kbytes of Flash memory, Math Accelerator, HR Timer, High Analog level integration	STM32G474RET6
Large bandwidth (10MHz), rail-to-rail 16V CMOS Op-Amp, single	TSX921
Applications	Solar inverters (string and central)

1 10 kW three level converter block diagram

Figure 1. 10 kW three level converter block diagram



2 Schematic diagrams

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

Figure 2. Circuit schematic STEVAL-10MPVCBM (1 of 3)

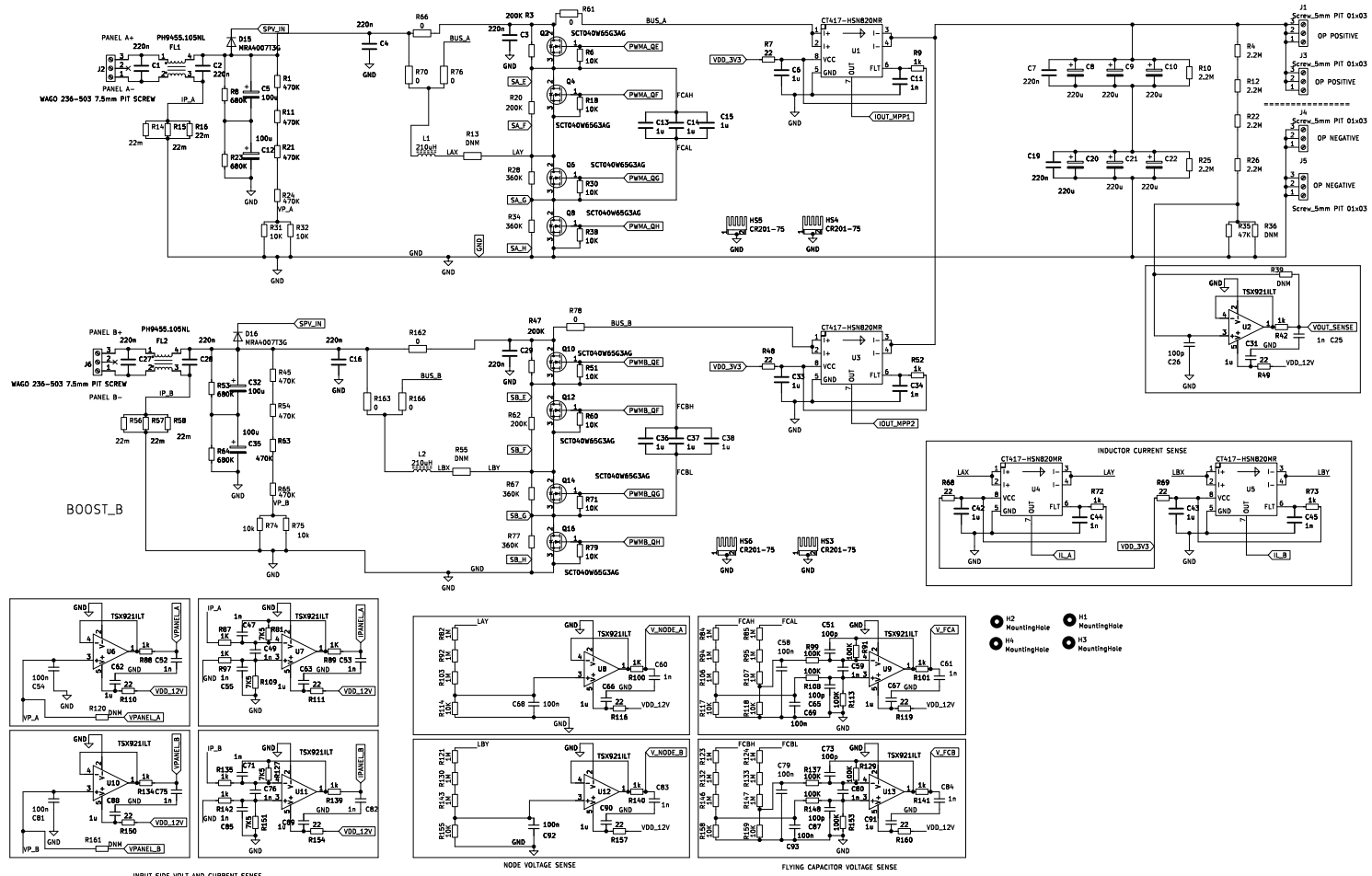


Figure 3. Circuit schematic STEVAL-10MPVCBM (2 of 3)

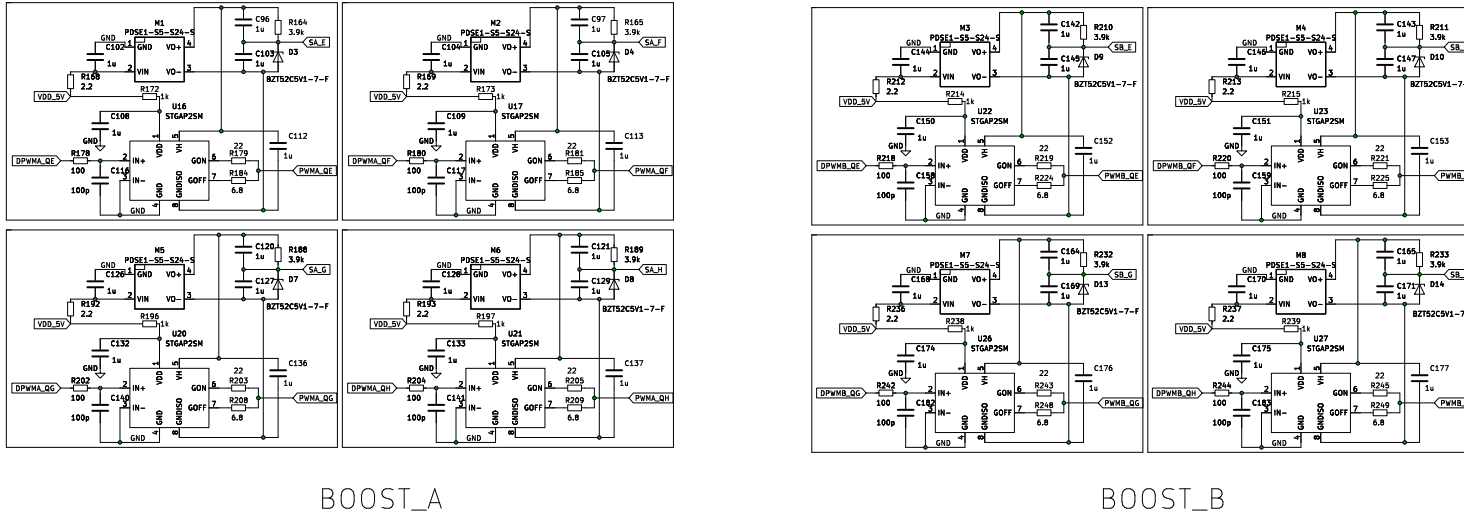
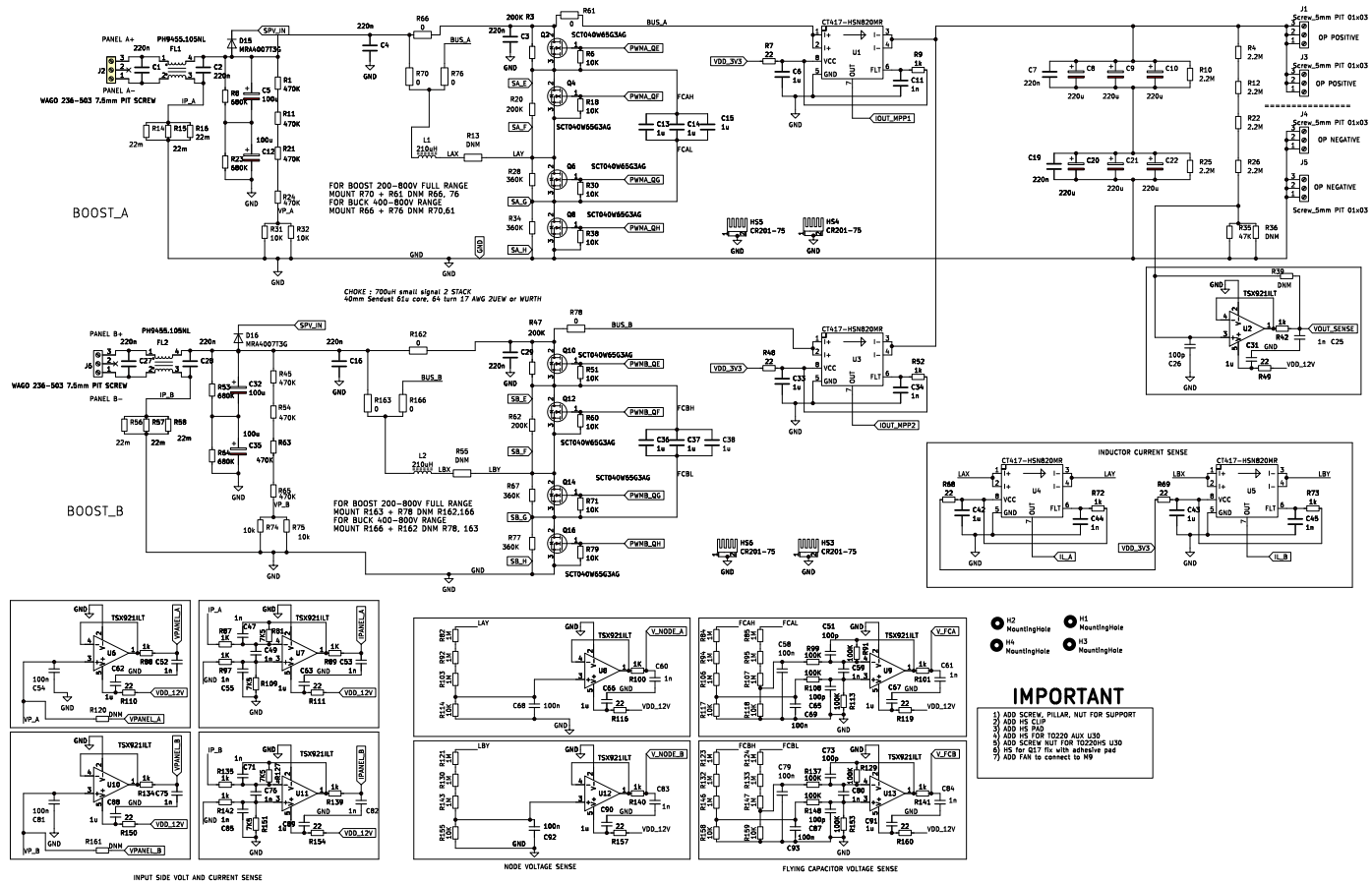


Figure 4. Circuit schematic STEVAL-10MPVCBM (3 of 3)



- H3 Mountinghole
- H4 Mountinghole
- H1 Mountinghole
- H5 Mountinghole

IMPORTANT

- 1) ADD SCREW, PILLAR, NUT FOR SUPPORT
- 2) ADD HS CUP
- 3) ADD HS PAD
- 4) ADD HS FOR T0220 AUX US0
- 5) ADD SCREW NUT FOR T0220S US0
- 6) HS FOR 017 IN WITH ADHESIVE PAD
- 7) ADD FAN TO CONNECT TO HS



Figure 5. Circuit schematic STEVAL-DPSG474 (1 of 3)

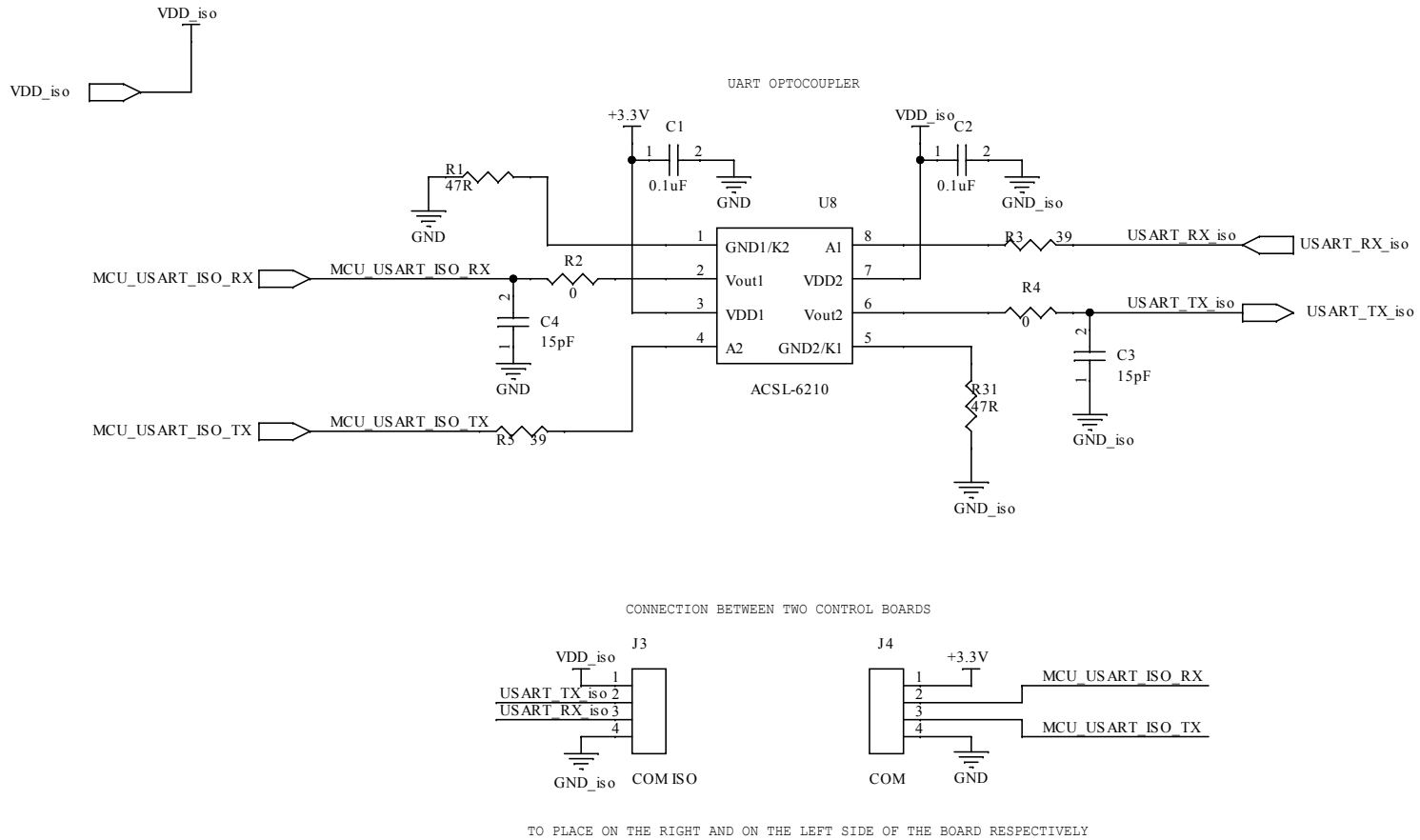


Figure 6. Circuit schematic STEVAL-DPSG474 (2 of 3)

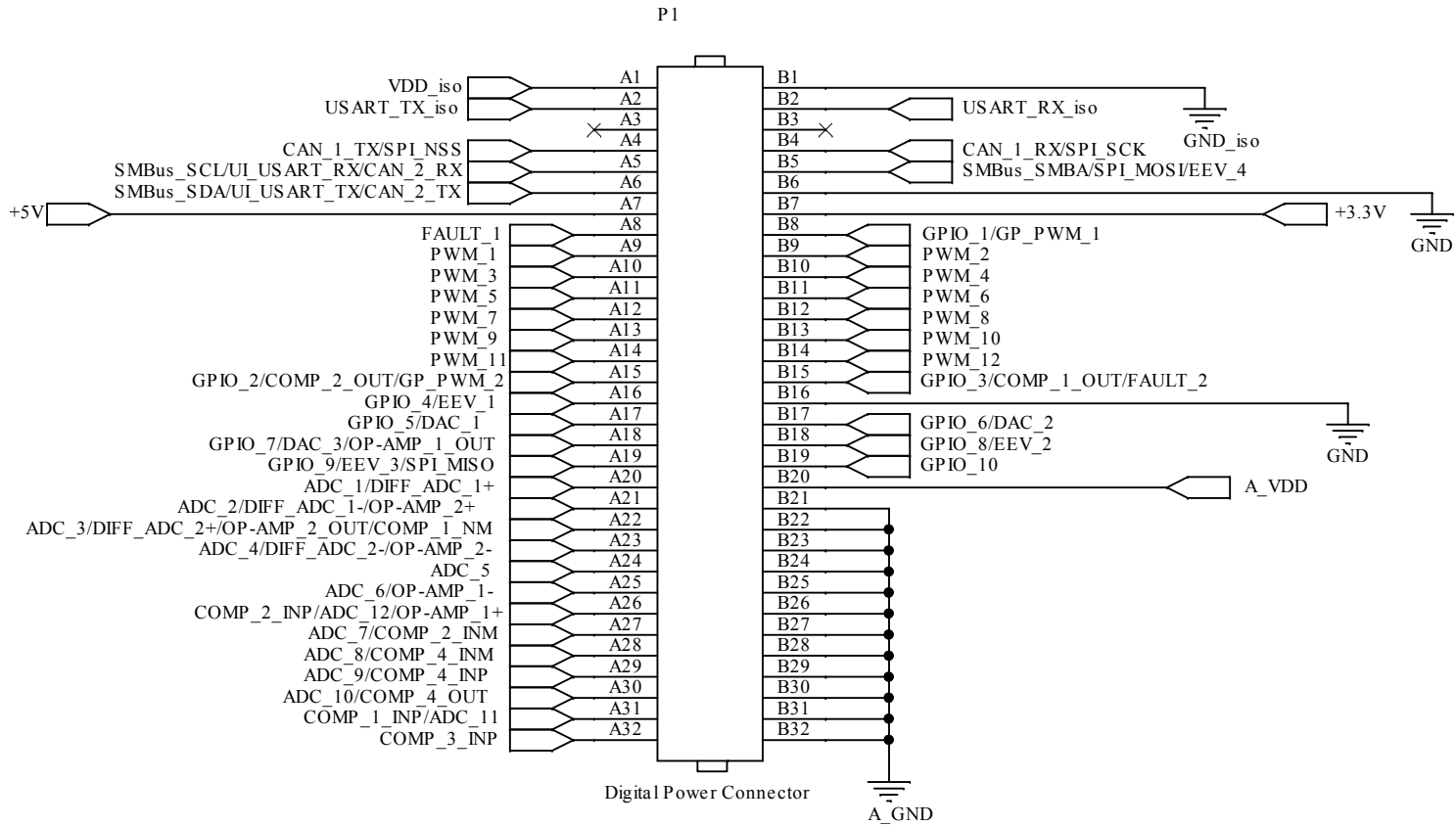
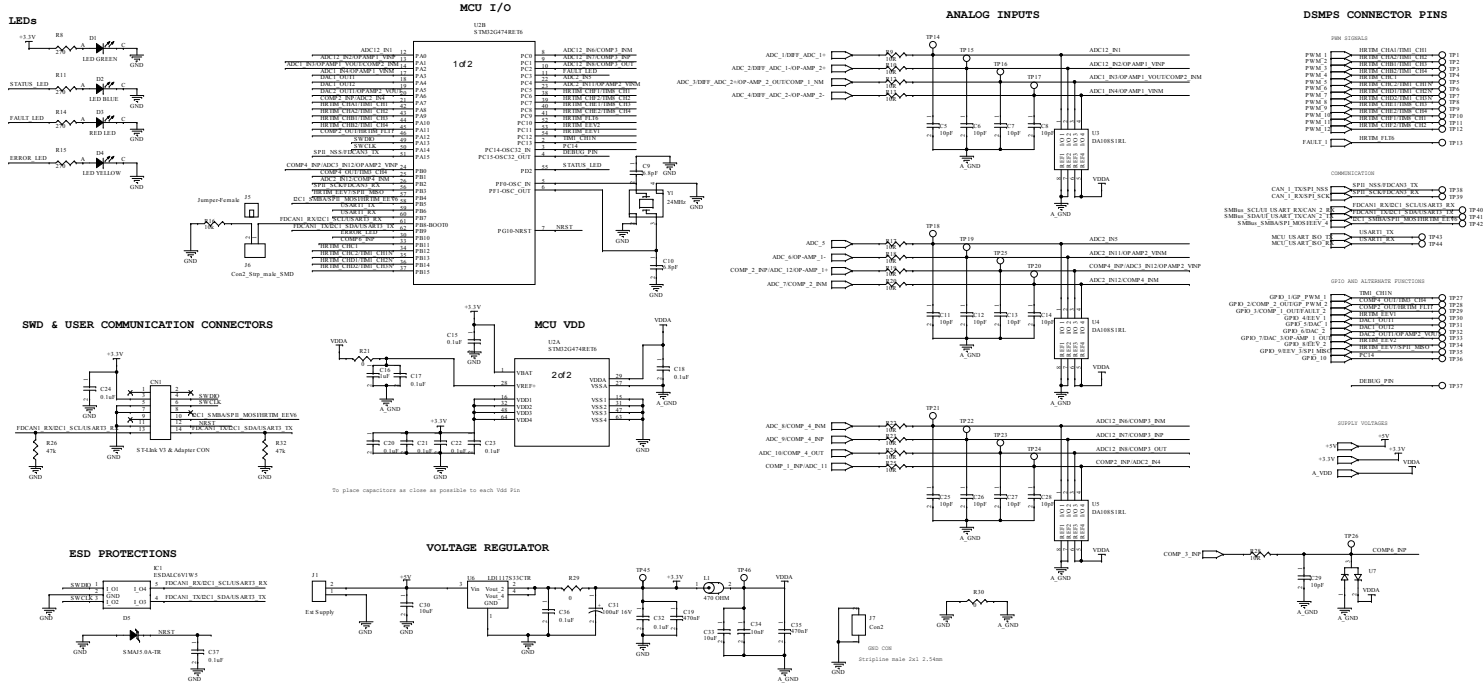


Figure 7. Circuit schematic STEVAL-DPSG474 (3 of 3)





3 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
14-Mar-2025	1	Initial release.

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