

## 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.

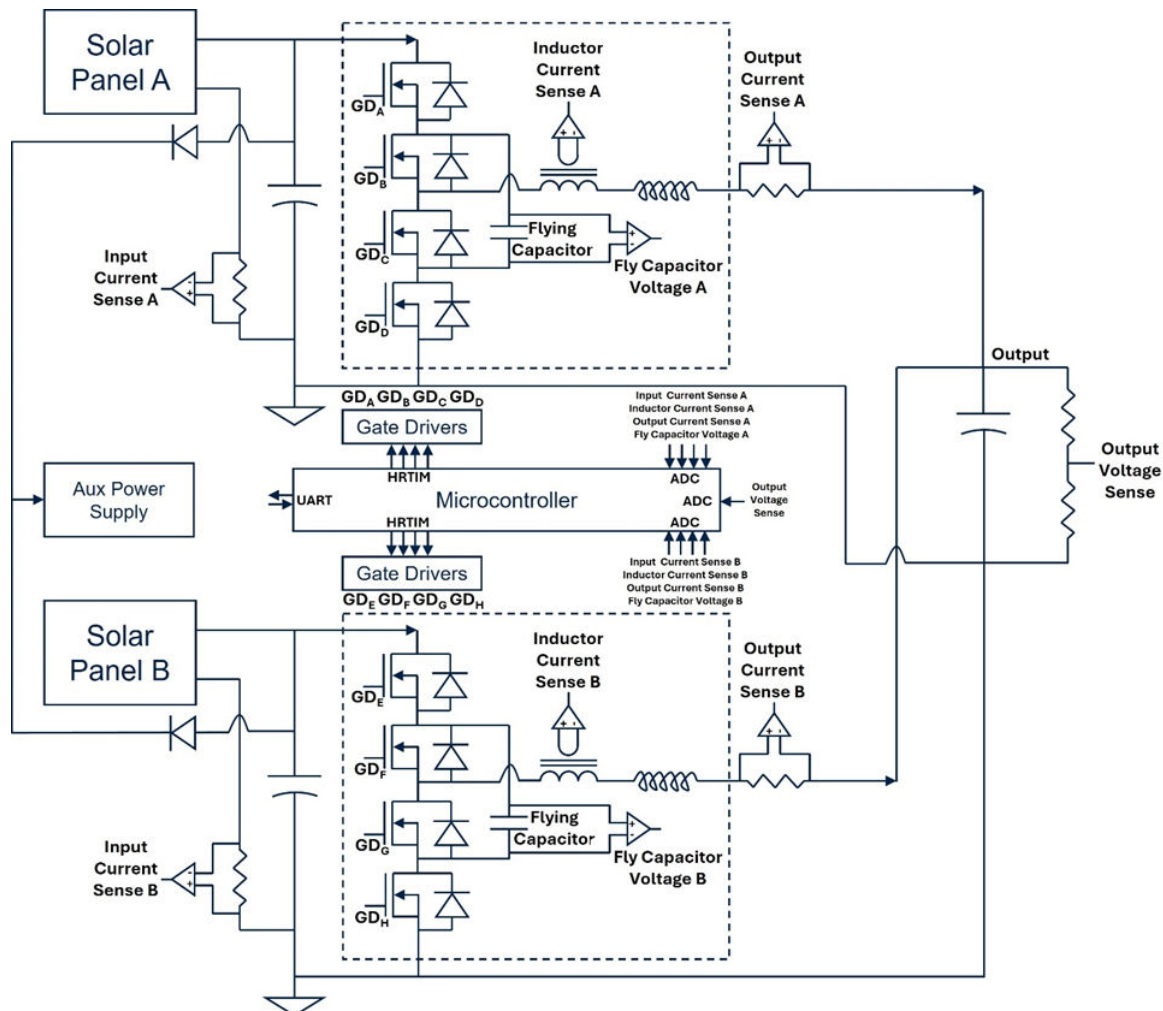
A single 32-bit **STM32G474RE** Arm MCU controls MPPT, dual-channel conversion, flying capacitor balancing, output regulation and protection mechanisms.

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

| Product summary                                                                                                                 |                                      |
|---------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 10 kW multi-level converter with dual channel MPPT                                                                              | <b>STEVAL-10MLPVCB</b>               |
| Automotive-grade silicon carbide Power MOSFET 650 V, 45 mOhm typ., 30 A in an HiP247 package                                    | <b>SCT040W65G3AG</b>                 |
| Galvanically isolated 4 A single gate driver                                                                                    | <b>STGAP2SM</b>                      |
| Mainstream Arm Cortex-M4 MCU 170 MHz with 512 Kbytes of Flash memory, Math Accelerator, HR Timer, High Analog level integration | <b>STM32G474RET6</b>                 |
| Large bandwidth (10MHz), rail-to-rail 16V CMOS Op-Amp, single                                                                   | <b>TSX921</b>                        |
| 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)

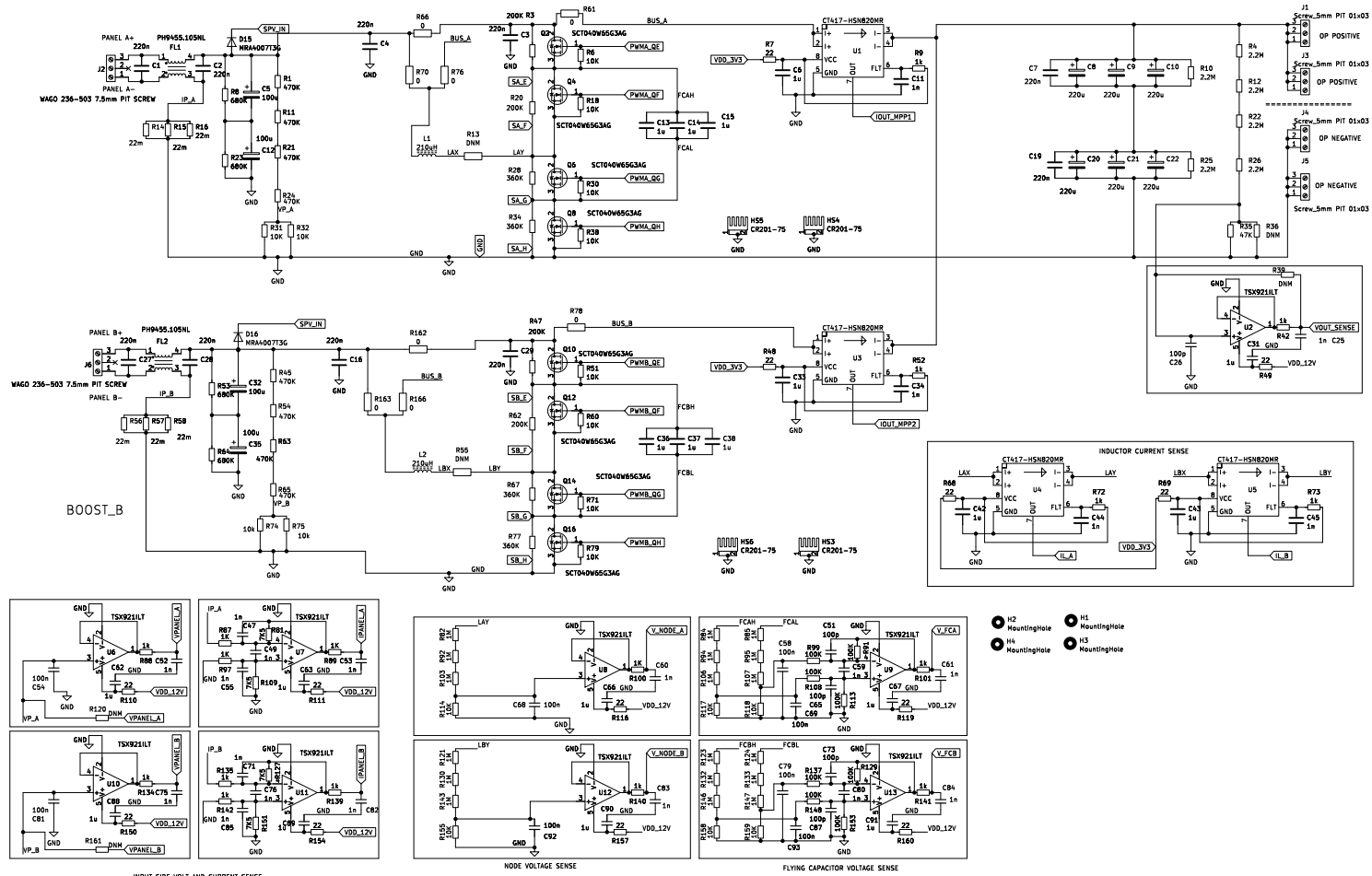


Figure 3. Circuit schematic STEVAL-10MPVCBM (2 of 3)

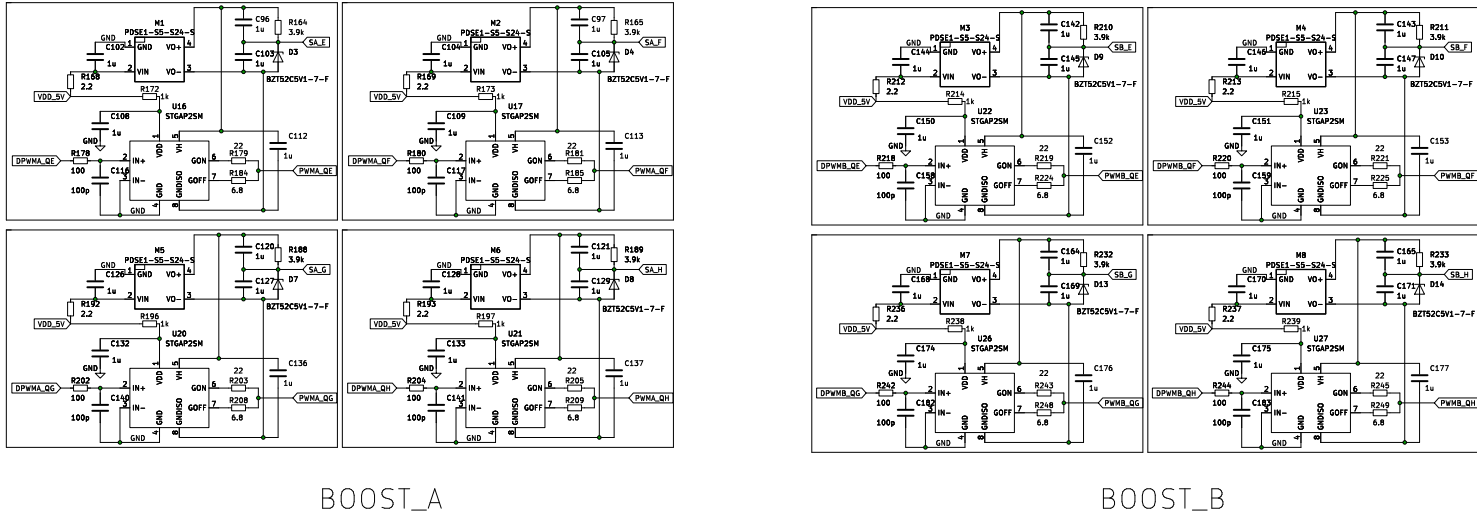


Figure 4. Circuit schematic STEVAL-10MPVCBM (3 of 3)

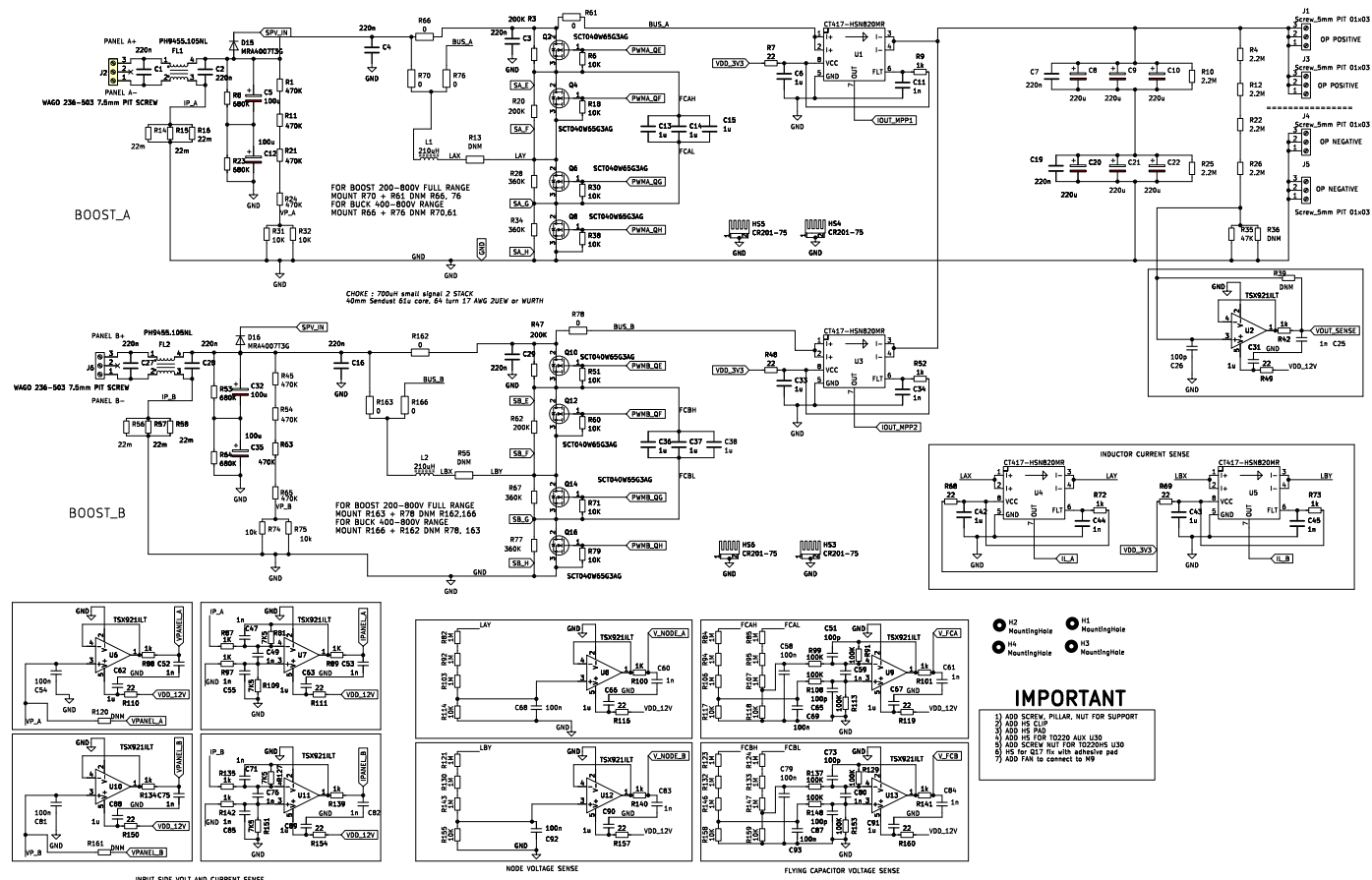


Figure 5. Circuit schematic STEVAL-DPSG474 (1 of 3)

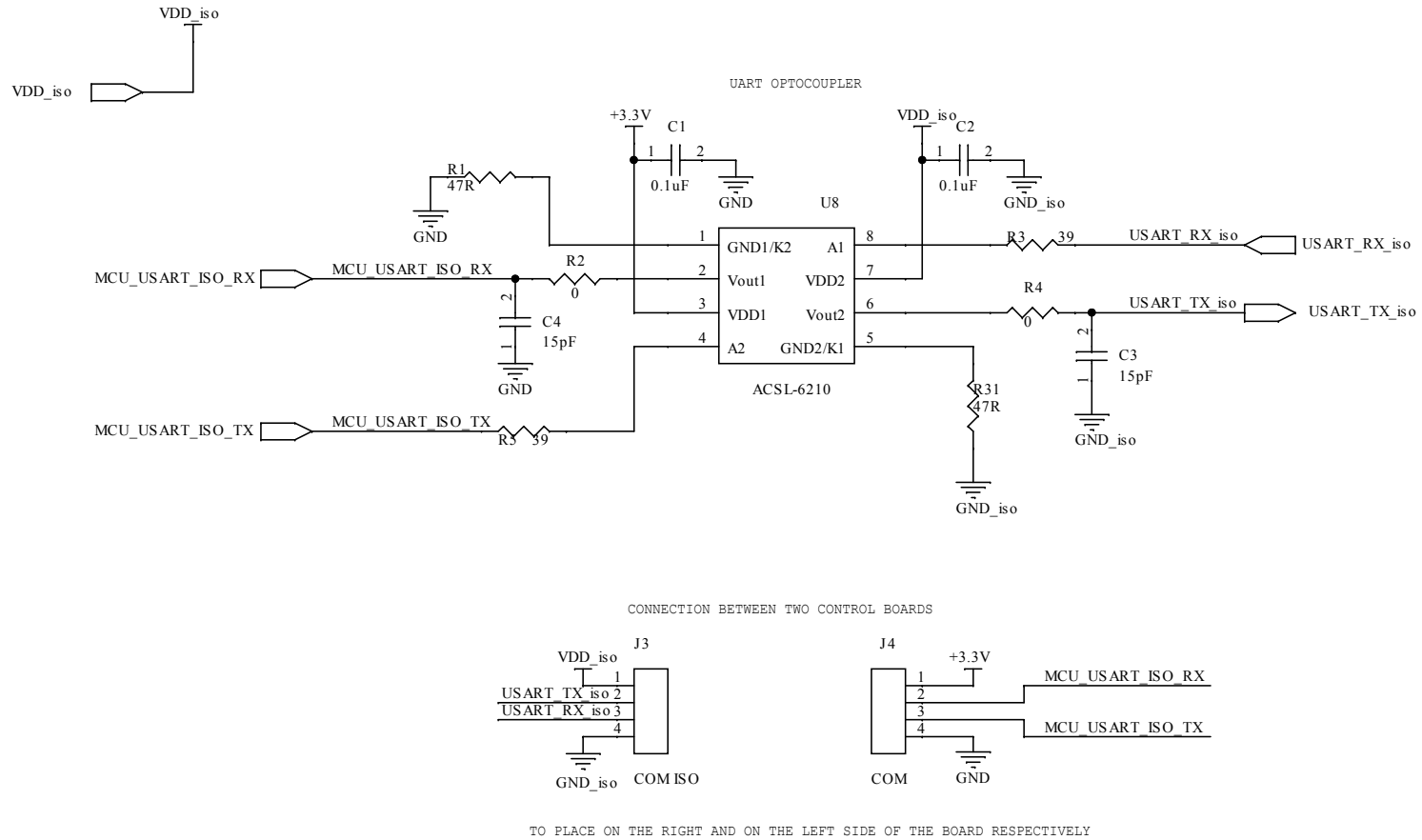
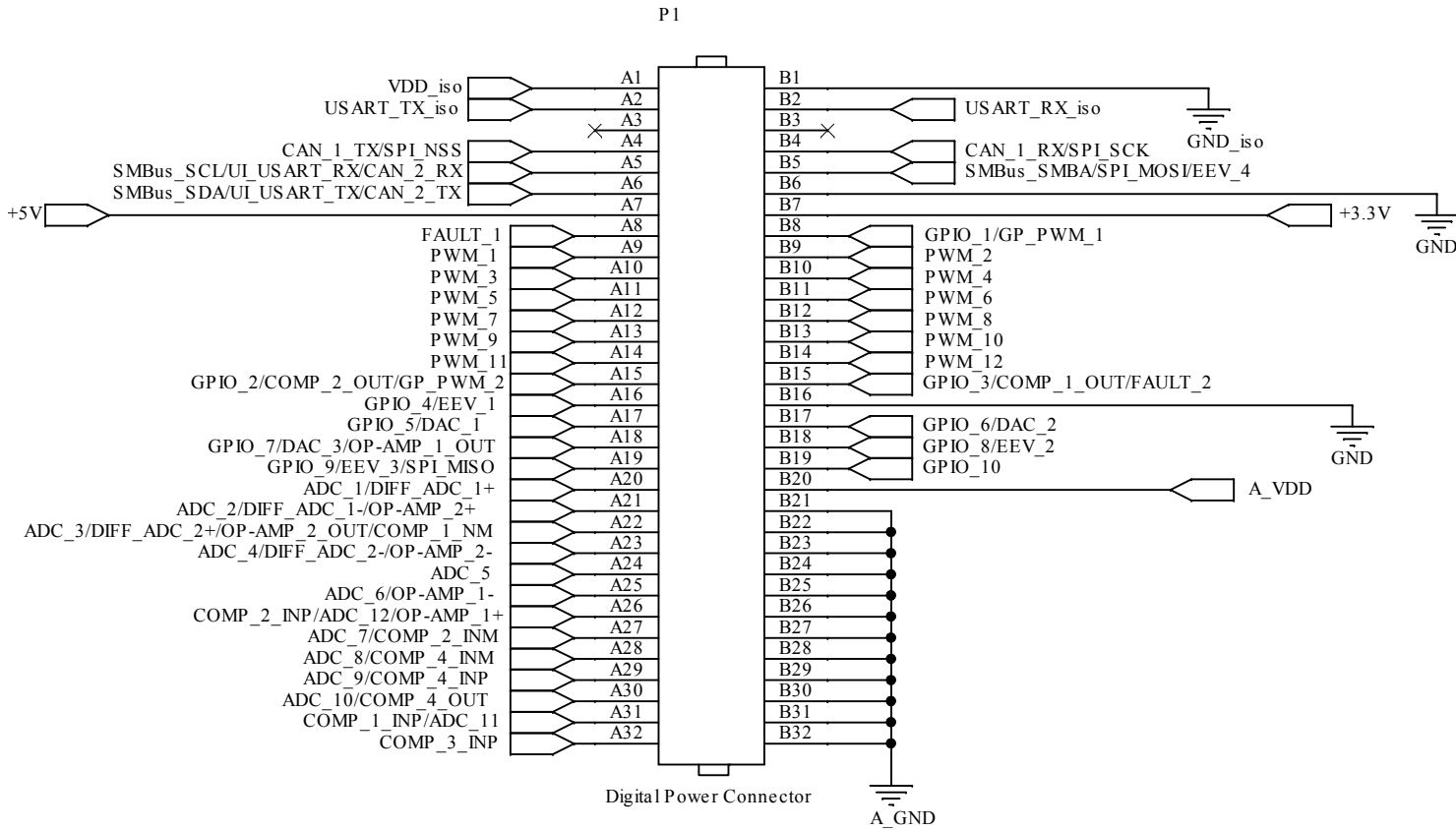


Figure 6. Circuit schematic STEVAL-DPSG474 (2 of 3)





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### 3 Custom evaluation boards information

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*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.         |
| 31-Jul-2025 | 2        | Updated Product summary. |

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