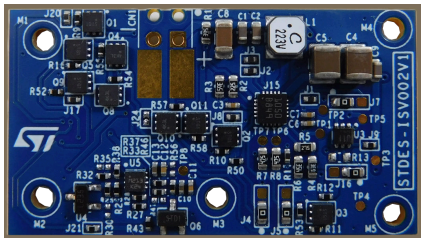
STDES-ISV002V1

Data brief

Solar panel harvesting system add on for STEVAL-ASTRA1B platform



Fully assembled board developed for performance evaluation only, not available for sale

Product summary	
Solar panel harvesting system add on for STEVAL-ASTRA1B platform	STDES-ISV002V1
Multiconnectivity asset tracking reference design based on STM32WB5MMG and STM32WL55JC	STEVAL-ASTRA1B
Ultra low power energy harvester and battery charger with embedded MPPT and LDOs	SPV1050TTR
Applications	Solar Distributed Generation

Features

- Solar energy harvesting by SPV1050 (boost configuration)
- Cold start minimum input voltage/current 0.55 V / 30 uA
- 2.6 to 5.3 V trimmable output overvoltage level (± 1% accuracy)
- 2.2 to 3.6 V trimmable output undervoltage level (± 1% accuracy)
- Two fully independent LDOs (1.8 and 3.3 V output) with enable/disable pins
- PV voltage measurement circuit build around TSU102 operational amplifier
- Selectable outdoor and indoor PV voltage measurement range
- 34 pins expansion connector compatible with STEVAL-ASTRA1B

Description

The STDES-ISV002V1 is a design example for a solar panel harvesting system based on SPV1050 and featuring as an add-on for the Astra platform STEVAL-ASTRA1B.

Although the STDES-ISV002V1 can work as a standalone battery charging system, its mechanical dimension and screwing holes have been designed to fit with the STEVAL-ASTRA1B application board and case.

When the two boards are connected by the 34-pins connector (J6) the STDES-ISV002V1 purposes longer autonomy of the STEVAL-ASTRA1B recharging the on-board battery by harvested energy from an external PV panel.

Apart enabling all the features offered by the SPV1050 (ultra-low power energy harvester and battery charger), the STDES-ISV002V1 offers a smart light irradiation sensing circuit and a wide set of drop jumpers allowing the user to set different configurations for easier fine-tuning of the application.

As an example, for the board supply rail (V_{DD}), the user can select between five supply sources (V_{STORE}, V_{LOD1}, V_{LOD2} generated by the SPV1050; V_{REG1}, V_{REG2} from the J6) by the proper setting of JP10, JP11, JP12, JP13.

Similarly, JP14, JP15, JP16, JP17, JP18, and JP19 can be set for the selection of the desired voltage supplied by the STDES-ISV002V1.

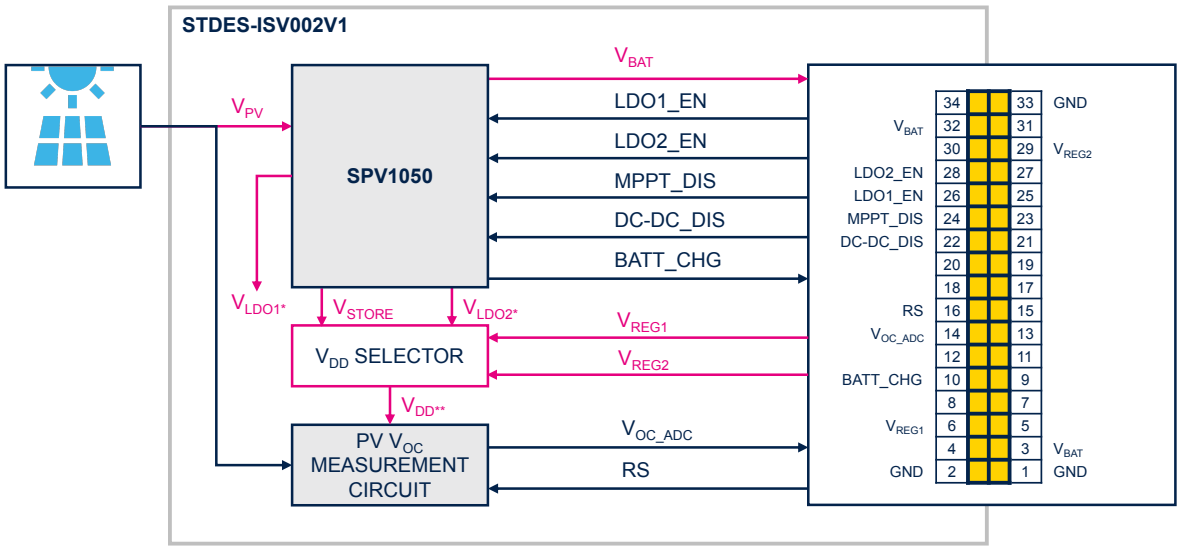
The input resistor setting (R1, R2, R3) of the STDES-ISV002V1 is optimized for the use with the PV panel AM-5412CAR. However, the same resistor setting can be maintained if different PV panels with the same VOC and VMP characteristic is used, instead.

For PV panels with different electrical characteristics, the instruction for the proper selection of the input resistors can be find in the SPV1050 datasheet.

The output resistor setting (R4, R5, and R6) is optimized for batteries with EOC set to 4.2 V and UVP set to 2.2 V. For different application requirements, please refer to the design rules in the SPV1050 datasheet.

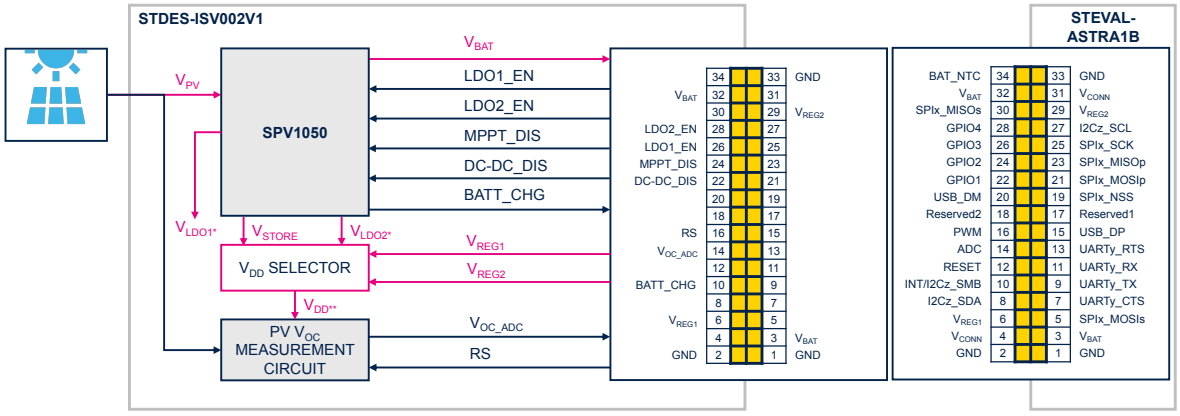
1 Block diagram

Figure 1. STDES-ISV002V1 block diagram



(*) V_{LDO1} = 1.8V (available but not used in the default configuration) – V_{LDO2} = 3.3V
(**) By default V_{DD} = V_{LDO2}

Figure 2. STDES-ISV002V1 connections with STEVAL-ASTRA1B



(*) V_{LDO1} = 1.8V (available but not used in the default configuration) – V_{LDO2} = 3.3V
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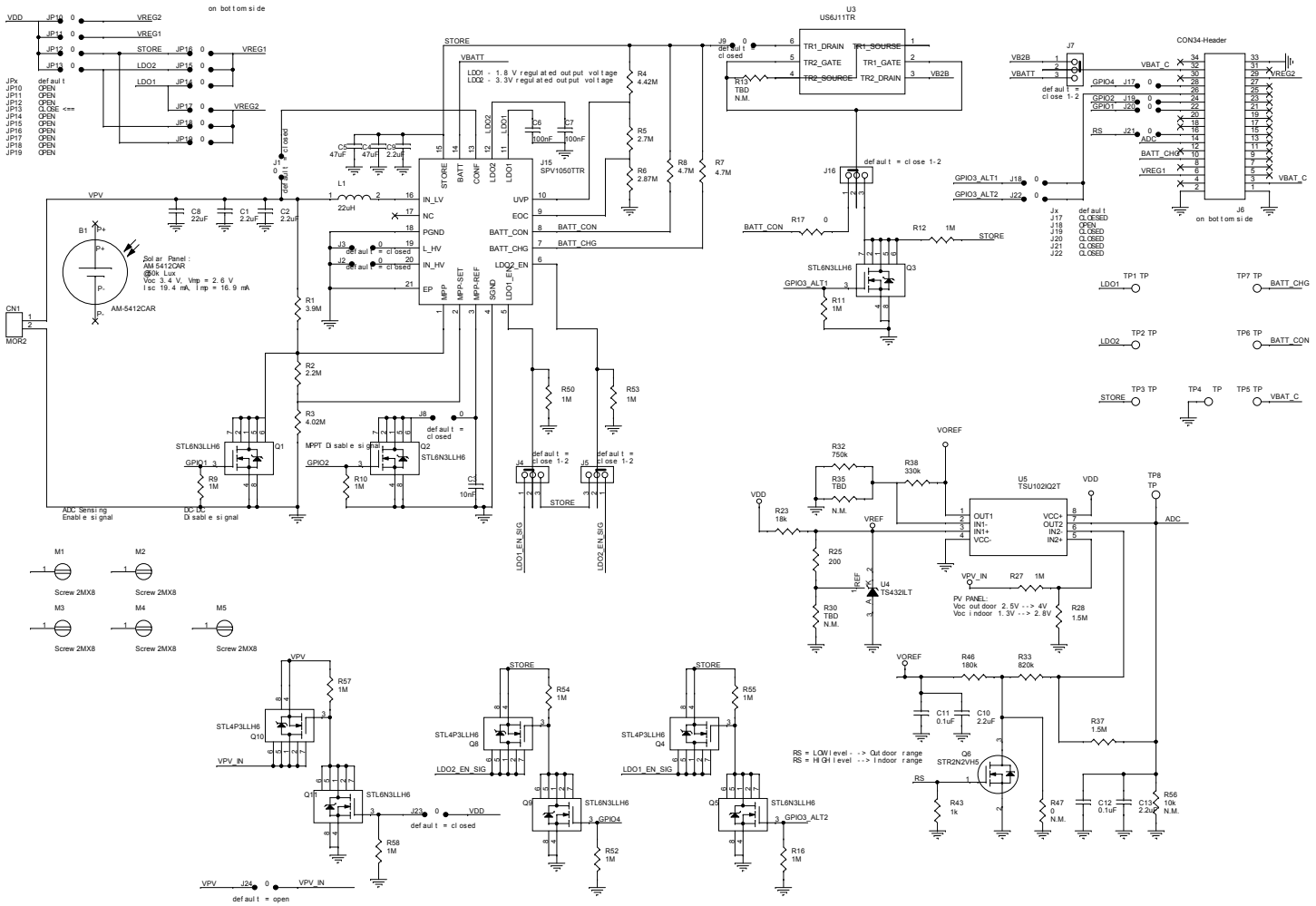
2 Schematic diagrams

Figure 3. **STDES-ISV002V1 circuit schematic**



Revision history

Table 1. **Document revision history**

Date	Revision	Changes
17-Oct-2023	1	Initial release.