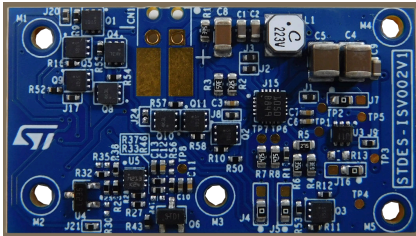


Solar panel harvesting system add on for STEVAL-ASTRA1B platform



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

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 ($\pm 1\%$ accuracy)
- 2.2 to 3.6 V trimmable output undervoltage level ($\pm 1\%$ 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_{L0D1} , V_{L0D2} 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**.

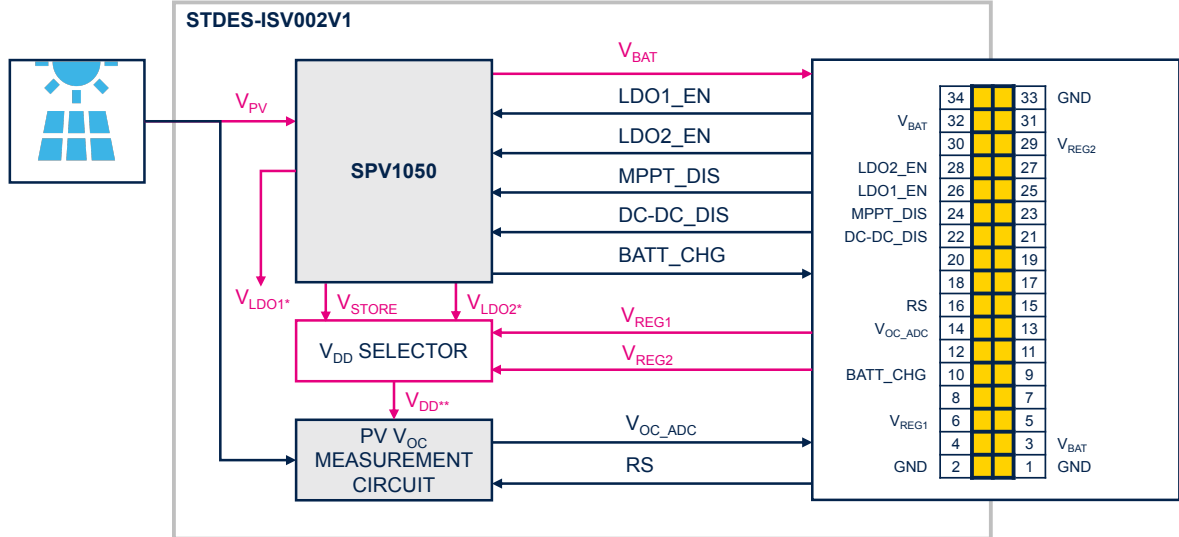
The input resistor setting (R1, R2, R3) of the **STDES-ISV002V1** is optimized for the use with the PV panel AM-5412CAR. However, the same resistor setting can be maintained if different PV panels with the same VOC and VMP characteristic is used, instead.

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

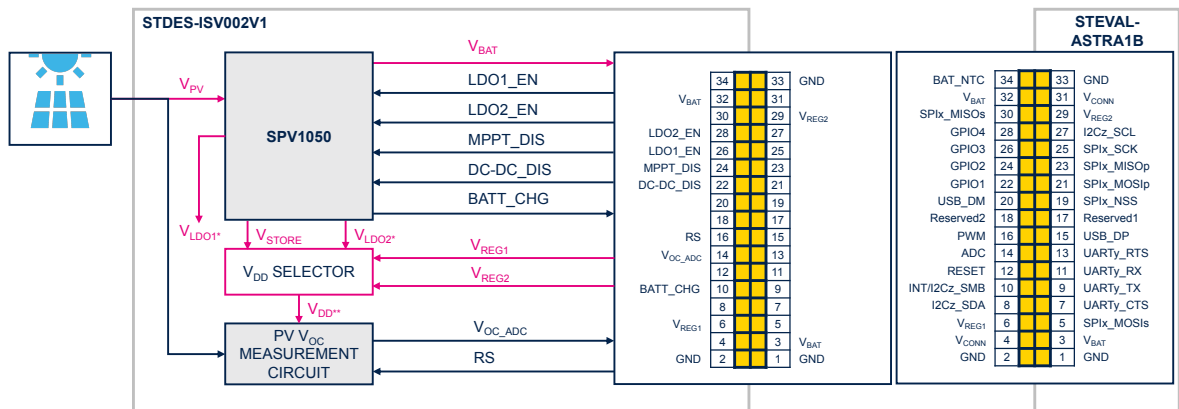
The output resistor setting (R4, R5, and R6) is optimized for batteries with EOC set to 4.2 V and UVP set to 2.2 V. For different application requirements, please refer to the design rules in the **SPV1050** datasheet.

| 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 |

1 Block diagram

Figure 1. STDES-ISV002V1 block diagram


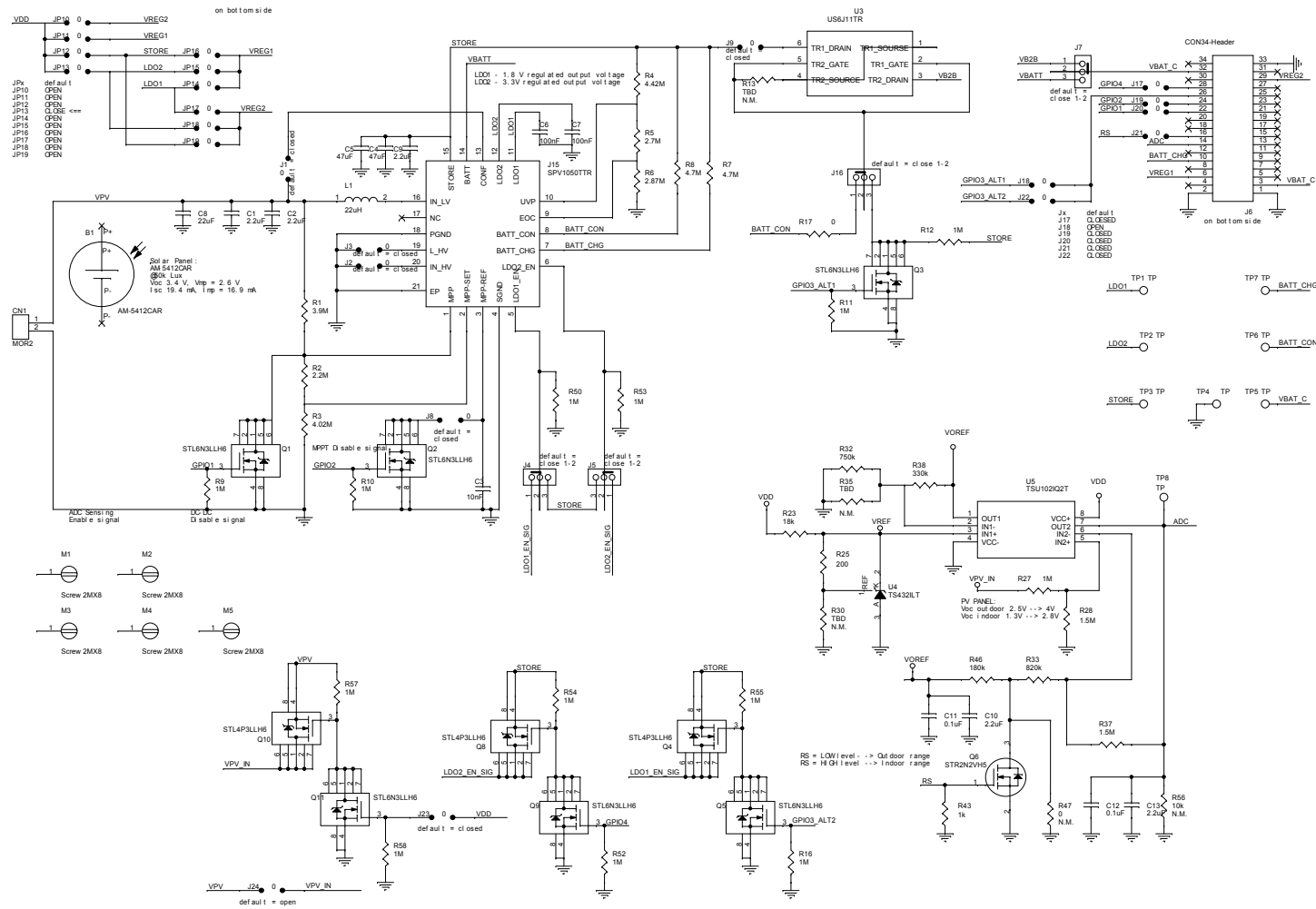
(*) $V_{LDO1} = 1.8V$ (available but not used in the default configuration) – $V_{LDO2} = 3.3V$
 (**) By default $V_{DD} = V_{LDO2}$

Figure 2. STDES-ISV002V1 connections with STEVAL-ASTRA1B


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

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. |

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