

# High-efficiency solar battery charger



STMicroelectronics

## High-performance solar battery charger with embedded maximum power point tracking

The SPV1040 is a high-efficiency, low-power, low-voltage DC-DC step-up converter that maximizes the energy transferred from the solar panel to the load using an embedded MPPT algorithm. It is based on a perturb-and-observe method which applies a duty cycle variation to a PWM signal according to the input power trend.

Furthermore, the device guarantees the safety of the application by implementing either an overcurrent or over-temperature protection and by regulating the battery voltage at any time.

The 0.3 V start-up input voltage is well suited to any portable application where only a few photovoltaic power cells are used.

### Key features

- 0.3 V up to 5.5 V input operating voltage
- 120 m $\Omega$  internal active switch
- 140 m $\Omega$  internal synchronous rectifier
- 2 up to 5.2 V output voltage regulation
- 1.8 A maximum input current
- 155 °C over-temperature shutdown

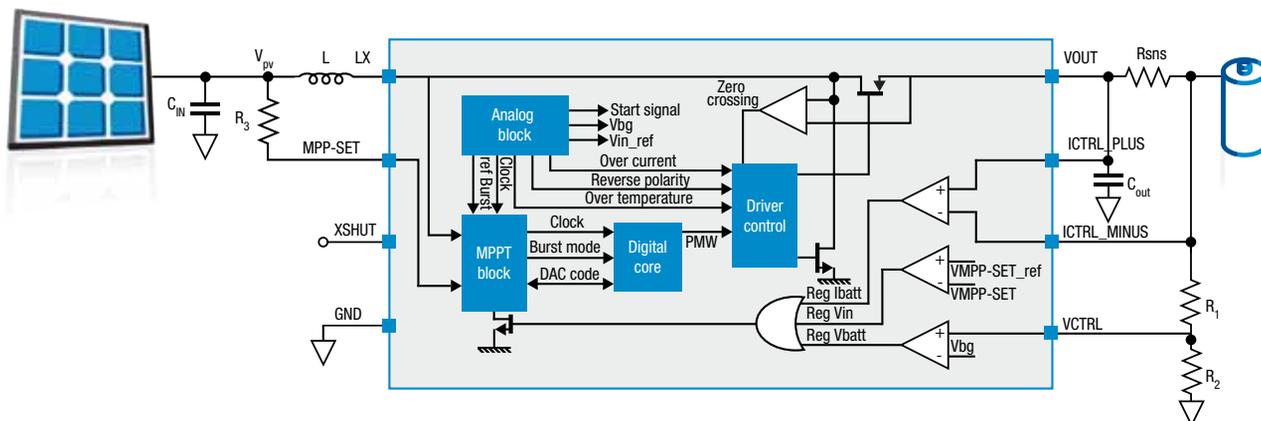
### Key benefits

- Energy harvesting in very low-power applications
- Up to 95% efficiency
- Battery charge current monitoring
- Output voltage regulation
- Thermal protection

### Targeted applications

- Portable consumer devices
- Toys, mobile phones
- Portable healthcare, sensors, calculators, watches, surveillance

## SPV1040 application diagram



## SPV1040 product table

Part number	Input voltage (V)	Regulated output voltage (V)	Maximum input current (A)	Thermal shutdown	Output current limitation	Shutdown enable pin	Package
SPV1040T	0.3 up to 5.5	2 up to 5.2	1.8	Y	Y	Y	TSSOP8 tube
SPV1040TTR	0.3 up to 5.5	2 up to 5.2	1.8	Y	Y	Y	TSSOP8 tape and reel

The STEVAL-ISV006V2 demonstration board simplifies application development and easily achieves the best trade off at system level by matching either the panel or the battery characteristics. The STEVAL-ISV012V1 is a demonstration board that maximizes the solar energy harvested while optimizing the charging profile and protecting Li-ion batteries.



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