

Highly Efficient, Energy Harvester for various AC or DC Sources

Features

Ultra-low power start-up

- Cold start from 50 mV input voltage and 3,5 μ W input power (typical).

Ultra-low power boost regulator

- Harvesting input voltage range from 25 mV to 1V.

High efficiency for very low energy

- 60% for 10 μ W.

Support various storage elements

- Supercapacitors.
- Ni-MH rechargeable battery (1.2V) and packs (2.4V, 3.6V).
- Li-ion rechargeable battery (3.7V).

Support various AC or DC Sources

- AC sources: RF and Piezo harvesting.
- DC sources: Thermocouple, PV cell.

Applications

RF harvesting, IoT sensors, home automation, remote controllers, health and medical monitoring devices

Description

Waven provides energy harvesting technology to power up low-power consumption devices and protect the environment. Waven is working for the planet, for society, for business prosperity, and to contribute to the increased quality of life. Our products reduce carbon footprint and reinforce sustainability.

Waven energy harvesting products make life easier and the environment cleaner. The

Waven Power Management (WPM) is an energy management circuit that transforms DC or AC power from different sources to and supply small electronic devices with low power consumption. The WPM allows to extend battery lifetime and ultimately eliminate the primary energy storage element in a large range of wireless applications such as IoT sensors, home automation, remote controllers, health and medical monitoring devices.

The WPM has an ultra-low power boost converter to charge a storage element, such as a Ni-MH and Li-ion rechargeable battery, a thin film battery, a supercapacitor or a conventional capacitor. The boost converter operates with input voltages ranging from 25 mV to 1 V.

WPM has an extremely low cold-start circuit, it can start operating with empty storage elements at an input voltage as low as 50 mV and an input power of only 3,5 μ W.

Absolute Maximum Ratings

| Parameter | Value |
|--------------------------------|--------------|
| Voltage in | 1V |
| Current in | 40mA |
| Output Power | 25mW |
| Operation junction temperature | -50 - +125°C |
| Storage temperature | -60 - +150°C |

Tab.1. Absolute Maximum Ratings.



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Electrical Characteristics at 25 °C

| Parameter | Condition | Min | Typ | Max | Unit |
|---------------------------------------------------------------------------------|--------------------------|-------|-----|-----|------|
| Input voltage and input power | | | | | |
| Source power required to cold start. | During cold start. | 3.5 | | | μW |
| Input voltage of the energy source (maximum given by the open-circuit voltage). | During cold start. | 0.05 | | | V |
| | After cold start. | 0.025 | | 1 | |
| Harvested current from the energy source. | After cold start. | | | 50 | mA |
| Voltage level of the Maximum Power Point. | After cold start. | 0.025 | | 1 | V |
| DC-DC converter | | | | | |
| Output voltage | During normal operation. | 1.2 | | 3.7 | V |
| Total load current supplied by the WPM | | 0 | | 40 | mA |
| Storage element | | | | | |
| Voltage on the storage element. | | 0 | | 3.7 | V |
| Voltage on the primary battery. | | 0.7 | | 3.7 | V |
| Quiescent current from battery when the boost converter is not running. | $V_{BAT} = 1.2 V$ | | | 100 | nA |

Tab.2. Typical Electrical Characteristics at 25 °C

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