nPM2100 Preliminary Datasheet

NORDIC SEMICONDUCTOR

Contents

1. nPM2100 Preliminary Datasheet

This Preliminary Datasheet contains functional descriptions, register tables, and electrical specifications, and is organized into chapters based on the modules and peripherals that are available in this device.

- nPM2100 Preliminary Datasheet v0.7 [PDF]

The nPM2100 Power Management IC (PMIC) is designed for primary (non-rechargeable) batteries in an extremely compact form factor. It features an ultra-efficient boost regulator and a wide range of energy-saving features, all of which extend the operating time for non-rechargeable battery applications. nPM2100provides power regulation for low power microcontroller units (MCU) and System-on-Chip (SoC) devices, like the nRF52, nRF53, and nRF54L Series advanced wireless multiprotocol SoCs from Nordic Semiconductor.

It features one boost regulator that supplies 1.8 V to 3.3 V output, from input voltages of 0.7 V to 3.4 V. Supported batteries include any battery that operates within the input voltage range of nPM2100.

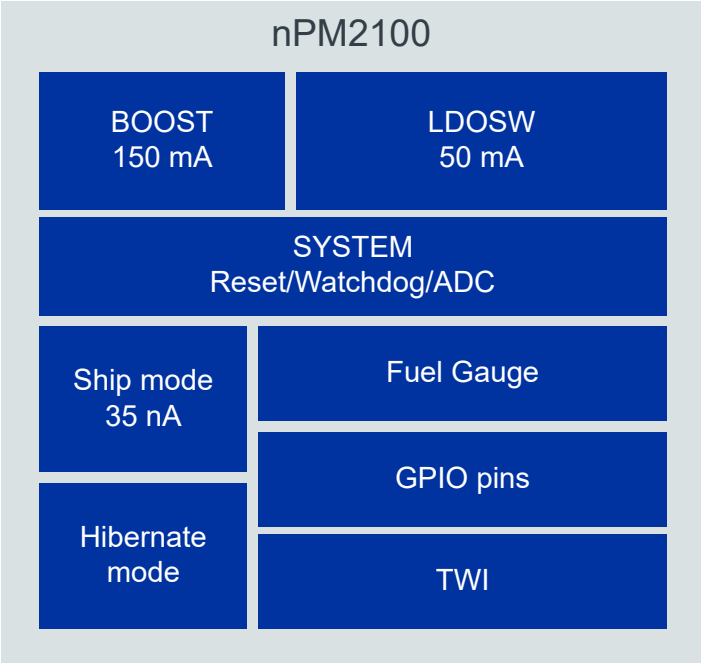
The 150 nA IQ internal boost regulator is among the most efficient boost regulators on the market. A 35 nA Ship mode allows the device to be shipped with batteries inserted without draining the battery. Timed wakeup is available in Hibernate mode for applications that spend most of their time in deep sleep, lowering sleep current to 175 nA and extending battery lifetime by almost triple.

Designed to provide highly efficient power regulation for any primary-cell application, the nPM2100 comes with exceptional software support found in the nRF Connect SDK. The nPM2100 is also suitable for use with other host devices.

nPM2100 features precise algorithm-based fuel gauging. Standard voltage-based estimation is often inaccurate, leading to replacing batteries that are still charged, or unexpected depletion. Instead, nPM2100 uses a voltage and temperature-based fuel gauge running on the host microprocessor for more accurate readings, ensuring full battery utilization with minimal additional load.

Key features

- Ultra-efficient boost regulator
  - 1.8 V to 3.3 V output
  - 150 mA max
- LDO/Load switch supplied by the boost regulator
  - 0.8 V to 3.0 V in LDO mode
  - 50 mA max
- 35 nA Ship Mode
- 175 nA Hibernate mode with wakeup timer
- Fuel gauge for primary cell batteries
- 0.7 to 3.4 V supply voltage
- Multiple package options
  - 1.9x1.9 mm WLCSP
  - 4.0x4.0 mm QFN16



Features:

- Ultra-high efficiency boost regulator
  - 0.7 V to 3.4 V input voltage range
  - 1.8 V to 3.3 V output voltage range
  - Up to 150 mA output current
  - Up to 93% efficiency
  - Soft start
- Linear voltage regulator/load switch (LDOSW)
  - Input connected to boost output
  - 0.8 V to 3 V output voltage range
  - Up to 50 mA output current
- Ultra-low power Ship mode
  - 35 nA current consumption
  - Wakeup or enter from a button press
  - Wakeup from breaking a connection
  - Enables the product to be shipped with batteries
  - Eliminates pull-tabs and enhances out-of-the-box experience
- Low power fuel gauge and System Monitor
  - Battery state-of-charge information when paired with Nordic fuel gauge algorithm running on host MCU
- Multifunction single-button support
  - Long-press hard reset
  - Ship mode enter/exit
  - Power ON/OFF
  - User interface
- Two general purpose input/output (GPIO) pins
  - Boost and LDO/LS control
  - Interrupt output
- System management features
  - 320 nA Hibernate mode with wakeup timer
  - Watchdog timer
  - Boot monitor
  - Power good output
  - GPIO pins
- I^2C compatible two-wire interface (TWI) for control and monitoring
- Low cost BOM and small solution size
  - Small form factor inductor and 5 capacitors
  - PCB area from 3.9x3.6 mm

Features:	

	• Package options
	  • WLCSP 1.9x1.9 mm
	  • QFN 4.0x4.0 mm

Revision history

About this document This document is organized into chapters that are based on the modules available in the IC.

Product overview

Absolute maximum ratings Maximum ratings are the extreme limits to which the device can be exposed for a limited amount of time without permanently damaging it. Exposure to absolute maximum ratings for prolonged periods of time may affect the reliability of the device.

Recommended operating conditions The operating conditions are the physical parameters that the chip can operate within.

ApplicationThe following application example uses nPM2100 and an nRF5x Bluetooth® Low Energy System on Chip (SoC). For other configurations, see Reference circuitry.

Ordering information This chapter contains information on IC marking, ordering codes, and container sizes.

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