LamaPLC: BQ25570 / CJMCU-2557 - Texas Instruments nano-power management IC and module

The Texas Instruments BQ25570 is a highly efficient nano-power management IC tailored for ultra-low-power energy harvesting applications, such as wireless sensor networks and wearable health devices. It effectively captures and controls energy from high-impedance sources such as solar panels, thermoelectric generators (TEGs), and piezoelectric modules.

The Texas Instruments BQ25570 is intended for ultra-low power applications and lacks complex communication interfaces such as I²C, SPI, or UART. Instead, it relays status and control data through basic digital I/O pins and external resistor networks.

Key Features and Specifications

- **Ultra-low Power DC-DC Boost Charger:** The device can cold-start from an input voltage as low as 330 mV and continue harvesting energy from inputs down to 100 mV. It features a very low quiescent current of 488 nA (typical).
- **Integrated Buck Converter:** In addition to the boost charger, the BQ25570 integrates a highly efficient, nanopower buck converter to provide a second, regulated power rail for a system load, achieving up to 93% efficiency and supporting peak currents up to 110 mA (typical).
- **Maximum Power Point Tracking (MPPT):** It includes a programmable MPPT sampling network to optimize power extraction from the connected energy harvester.
- **Battery Management and Protection:** The IC provides battery management features, including user-programmable overvoltage protection and an internally set undervoltage threshold, preventing rechargeable batteries (Li-ion, thin-film, supercapacitors, etc.) from being overcharged or depleted beyond safe limits.
- **Battery Good Output Flag:** A programmable output flag (BAT_OK) can be used to warn an attached microcontroller of impending power loss, allowing the system to take action or enter a low-power state.
- **Package:** The BQ25570 is available in a compact 20-lead 3.5-mm x 3.5-mm QFN package.

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CJMCU-2557

The CJMCU-2557 is a highly efficient nanopower energy harvesting module utilizing the Texas Instruments BQ25570 IC. It is designed to extract microwatt-to-milliwatt power from high-impedance DC sources, such as small solar panels or Thermoelectric Generators (TEGs).

Primary Power Terminals

These are usually the larger pads or screw terminals at the edges of the board:

- **INPUT+ / INPUT-:** Connect your energy source here (e.g., small solar panels, TEGs, or piezo elements).
- **BAT+ / BAT-:** Connect your storage element here (Li-ion/LiPo battery or a supercapacitor).
- **OUTPUT+ / OUTPUT-:** This is the regulated output from the built-in buck converter, used to power your sensors or microcontrollers.

BQ25570, sensor, Texas Instruments, nano-power management, DC-DC Boost Charger, MPPT, solar, thermoelectric, piezoelectric, energy harvesting, EH