Maximize energy storage and sustainability in IOT and low power wireless devices with energy harvesting PMIC

Key features and benefits

› High-efficiency low-power DC-to-DC converter
› Harvesting power range from 35 µW to 2 mW
› Advanced MPPT to maximize efficiency
› Ultra-fast MPPT interval of 0.7 seconds
› Small BOM with no external inductor required
› Multiple rechargeable batteries compatibility

Applications:

› Wireless IoT devices
› Smart remote controls
› Electronic shelf labels
› Wearable devices
› Industrial and environmental monitoring
› Consumer electronics
› Beacons

Nexperia NEH2000BY Energy Harvesting PMIC

Energy harvesting technology, powered by Nowi technology, has emerged as the means in which many power-related problems facing the IoT may be solved. The energy from incident light, vibrations, RF signals can be leveraged - resulting in devices being able to run indefinitely without the need for battery substitutions.

When energy harvesting is used, less room is needed for the energy storage resulting in device miniaturization and BOM reduction. IoT and low-power wireless devices can continue to operate indefinitely, eliminating the need replace batteries when they run out. Expanding battery life through energy harvesting positively impacts the environment by reducing battery waste and lowering the volume of raw materials used in battery production.

Energy harvesting is often perceived as difficult due to the level of customization required per application and many decisions application engineers are required to make in their PCB design process. In practice, this has acted as a barrier for implementation of energy harvesting technology. Nexperia's Energy Harvesting NEH2000BY PMIC changes this entirely. The unique design require a minimum number of external components, making the PCB design process straightforward.

The NEH2000BY includes pre-sets on the chip, making the implementation of the chip simpler. This offers an unprecedented ease-of-use for engineers. Even with limited energy harvesting knowledge, it is possible to quickly integrate and deploy high performing energy harvesting in new product designs.

Nexperia's advanced Maximum Power Point Tracking (MPPT) uses an embedded hill-climbing algorithm to deliver the maximum power to the load. The MPPT is designed to be independent of specific characteristics of the harvesters, therefore any harvester that fits the specifications of the chip can be used. Moreover, the MPPT circuit can detect the maximum power point with an interval of 0.7 second resulting in maximum efficiency in various environments where energy can rapidly change over time. The MPPT functions autonomously and requires no pre-programming. Consequently, the self-optimization makes it no longer required to have an extremely detailed understanding of the fluctuating environment.

The NEH2000BY is available in a 16-lead, 3 mm × 3 mm QFN package.

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EFFICIENCY WINS.

Innovative Power and Energy

Nexperia's energy harvesting PMIC removes the need for battery swaps, allowing for more sustainable product designs. NEH2000BY combines the lowest BOM cost with the smallest PCB footprint and the best average harvesting performance with an industry-fast maximum Power Point Tracking (MPPT) of under 1 second. Key features of the NEH2000BY include unique inductor-less technology which implies a minimum need for external components, conversion efficiency of up to 80%, up to 2x Voltage boosting. Power range of 54 µW at 600 lux with AM-1454 PV, and Energy: 1.3 mWh per day at 600 lux for 8 hours with AM-1454 PV.

Block diagram – NEH2000BY

Application design-in information
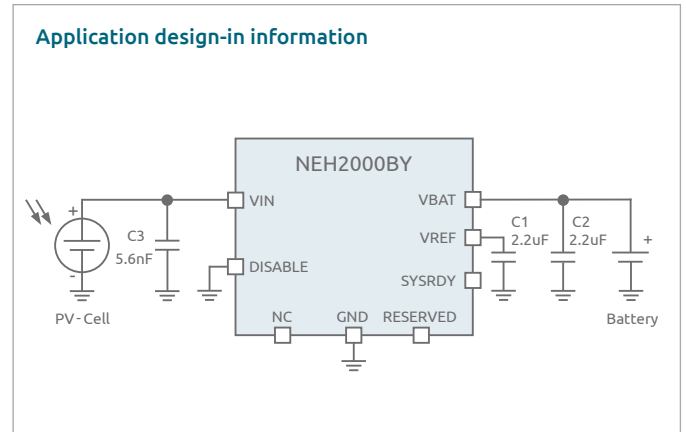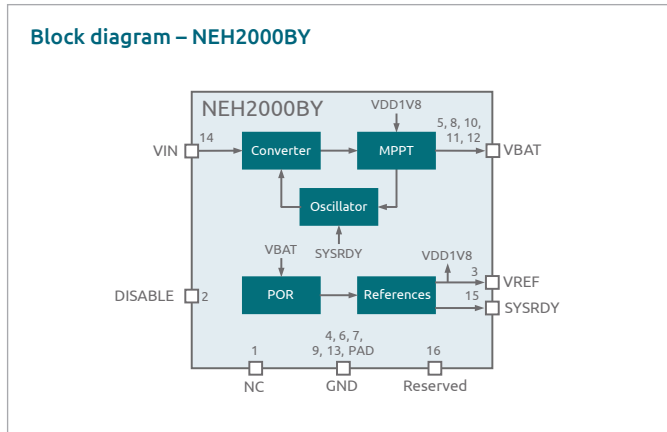
Ordering Information

Type number	Package		
	Name	Description	Version
NEH2000BY	SOT8076-1	Plastic Quad Flat package, no leads; 16 terminals: 0.5 mm pitch 3 mm x 3 mm x 0.75 mm body	1.0

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For more information on Nexperia NEH2000BY, visit nexperia.com/NEH2000BY

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