Self-Powered Timer

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Technology description

Executive Summary

Remotely powered sensors are used in a wide variety of fields from medical devices to structural health monitoring. Most applications need to know the what, where and when of the recorded data. Currently sensors have limited ability to time-stamp events without incorporating power consuming peripherals. There is therefore a need to develop a method to monitor time with little or no extra power required.

Description of Technology

Michigan State University has developed a novel self-powered timer driven by ambient thermal energy. The technology uses a novel floating-gate technique that takes advantage of the slow electron leakage from an electron trap and uses this to generate a time dependent signal. The energy to power the timer is generated by scavenging thermal energy. The prototype device has demonstrated a thermal powered timer capable of keeping time for one year. The expected target is a thermal powered timer capable of keeping time for 20 years.

Application area

Integrated circuits

Sensors for: structural health monitoring, military equipment, medical devices, etc.

Logistics, e.g., tracking products with time stamped radio frequency identification tags

Package tampering monitoring (in manufacturing or beyond)

Advantages

Self-powered

Enables time-stamp for documenting events

Low production cost

Timer has potential for use over several decades, e.g. in structural health monitoring

Institution

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