



Gentag's One-Point-Calibration Integrated Temperature Sensor

From Weapons to Wine: A New Approach for Passive RFID Sensor Tags

Gentag, Inc., a Washington, DC-based RFID IP development firm, has designed, patented, and successfully tested an ultra-linear, low-power single-calibration temperature-sensor circuit that can be directly integrated on any chip for either the Gen-2 UHF or the 13.56 MHz global RFID markets. The technology can also be used as a reference circuit to make accurate, low-cost passive RFID sensors (with no batteries); battery-assisted passive (BAP) sensors; or active sensor tags.

Since the sensor can be integrated with the RFID chip itself and occupies very little real estate, its added cost is insignificant. The sensor only needs a single-temperature calibration point (at the moment of chip testing) which enables significant fabrication cost-savings for the manufacturer – and ultimately, the end user. This issue has been one of the key obstacles for widespread RFID adoption of RFID sensors at the institutional level.

Integrated temperature sensing provides essential information in many RFID applications, such as the supply chain of perishables, pharmaceuticals, and any other temperature-sensitive products, as well as for many medical diagnostic tests and procedures. Market examples include supplies of plasma, munitions, biological materials, fresh fruit, and wine.

Gentag's temperature sensor is analog in nature and is specifically designed to consume minute amounts of power when it is on and reading out tag temperature – and none when off: it is always in thermal equilibrium with the tag. It can be switched on and off very quickly and can be fabricated using generic digital CMOS technology. Accuracy depends on the calibration temperature; when calibrated at 40 °C, the sensor's accuracy is ± 1 °C over the industrial temperature range (-20 to +100 °C), and ± 0.1 °C over the medical temperature range (34 to 42 °C).

This unique circuit establishes a reference for many other possible analog RFID sensors. Most sensors are themselves temperature dependent. Therefore, it becomes essential that an independent measure of temperature be made for accurate RFID sensor calibration and robust measurements of variables such as pressure, humidity, and conductivity. In addition, the same temperature sensor circuit can be utilized to establish accurate voltage or current references that are independent of temperature, references which facilitate the integration of many different kinds of sensors on passive, BAP, or active RFID tags.

In combination with Gentag's issued patent for using cell phones as readers for RFID-sensors (patent 7,148,803), this technology provides a novel, low-cost solution for wireless temperature monitoring and opens the way for the wide deployment and implementation of low-cost passive RFID sensor tags, RFID sensor networks, and a wide range of consumer and industrial applications.

For licensing opportunities for the Gen-2 or HF markets and for more information, contact Dr. John Peeters, email john.peeters@gentag.com. Media inquiries to Marc Onigman, The MarCeting Department, 617-413-2830, marconigman@msn.com.