EM Microelectronic Announces New UHF Battery-Assisted Passive

The EM4325 is ideal for real-time monitoring of perishables or as an EPC™ Gen2 RFID interface or modem for embedded applications

EM Microelectronic has announced the EM4325, a versatile and multipurpose, battery-assisted passive (BAP) RFID chip with integrated temperature sensor. This facilitates the expansion of established UHF RFID applications by offering longer read range, increased communication robustness and more configuration options and interface capabilities for auxiliary functions. EM Microelectronic designed the EM4325 with an advanced feature set which leads to performance and functionality well beyond that of ordinary Gen2 chips.
Operating in the UHF frequency range, the EM4325 is compliant with the following standards:

- ISO/IEC 18000-6 Type C and Type D (TOTAL)
- EPC™ Class 1 Gen2 / EPC™ Class 3 Gen2
- AIAG™ B-11
- ATA 2000

EM4325’s BAP RFID technology combines the lower complexity, simpler communication protocols and lower cost of passive RFID with significantly higher read range and increased communication robustness available with active RFID. The EM4325 operates in both BAP and purely passive modes. It integrates smart power management for longer battery life when used in BAP applications. The EM4325 also allows programmable duty cycle and automatic switching between battery-powered and field-powered operation when the tag is too far away from the reader. A unique ultra-low power (ULP) mode can be activated or disabled via a simple reader command. This ULP mode extends tag battery life when the tags are stored for long periods.

The EM4325 further contains 4 kbits of high speed, non-volatile memory (EEPROM). It supports either ISO or EPC™ data structures compliant with EPCglobal®’s Tag Data Standard, Version 1.6. To ensure full traceability, the chip is delivered with a factory programmed and serialized Unique Identifier (UID).

An integrated temperature sensor monitors temperature from -40°C to +64°C. In pure passive mode, the temperature sensor can be used for field-powered snapshot

readings. But the chip can also be programmed to perform self-monitoring with user-programmable alarm conditions (upper and lower temperature thresholds). The sensor may also be configured to provide Simple Sensor Data reporting according to the data formats defined in ISO/IEC 18000-6 and ISO/IEC 24753.

The most unique feature of the EM4325 may be the inclusion of a programmable external interface for an auxiliary functions and a 4 bit I/O port. These interfaces open the door to advanced applications where the EM4325 can be operated either as an RFID tag or as an RFID interface or modem for embedded applications. The auxiliary function may be configured as input for tamper detection or as an output to notify external devices of RF events. The 4 bit I/O port can be programmed to support 4 discrete signals or as a Serial Peripheral Interface (SPI) configurable as an SPI master or slave device.

Thanks to its rich feature set, the EM4325 can thus be used in a variety of use cases:

• **Standard Supply Chain Management:** EPC™ Gen 2 was developed to establish a standard for RFID tags used in supply chain applications (e.g., tracking inventory). The EM4325 is fully compliant with this standard. It also integrates additional security features such as its factory programmed and permanently locked unique ID to prevent tag cloning and a 32bit password protected access command. It can be operated in purely passive mode or in BAP mode when longer reading distances are required.

• **Supply Chain Temperature Monitoring:** In BAP mode, the internal temperature sensor of the EM4325 can be configured for self-monitoring operations with defined alarm levels, thus allowing the detection of disruptions in the cold chain. Fast and easy reads can be performed at each transfer of custody to guarantee the quality and security of the received goods (e.g. food, medical products), thus increasing profitability and delivered freshness.

• **Electronic Vehicle Identification (EVI):** BAP technology avoids the pitfalls of both passive and active RFID in EVI applications; it is significantly less expensive than active RFID but offers excellent read performance at high speeds and at long range, even in wet conditions. In BAP mode, the EM4325 offers -31dBm read sensitivity at chip level, which corresponds to open-field read ranges in excess of 50 meters. To cope with the speed of vehicles, EM4325 tags can also be configured for ISO/IEC 18000-6 Type D protocol, called TOTAL. TOTAL is a tag-talk-first protocol which allows the fastest possible tag detection and identification.

• **Asset Configuration and Control:** The EM4325 can be implemented as an integrated RFID interface or modem in a more complex system; with 4kbit of memory, it can be used as a Gen2-compliant communication channel for configuration operations. Specific parameters (e.g. pairing information for wireless devices) could be programmed into products which are already packaged, but

which are not yet powered. Once the product is unpacked and switched on, it could read these parameters via the SPI interface on the embedded tag. Furthermore, the availability of an RFID tag which is not just attached to an item, but which is truly integrated into and interfaced with a wide variety of consumer electronic devices enables many new opportunities for the “Internet of Things”.

• **Tamper Detection:** The EM4325 can be configured to support a seal tamper sensor that detects breakage or removal of a seal strap. The EM4325 is an ideal building block for a variety of electronic seal (e-seal) applications (e.g. container security or access control of sporting or cultural events bynon-transferable RFID wrist bands).

• **RFID for Challenging RF Environments:** In BAP mode, the EM4325 provides increased read reliability for bulk reads at longer distances or in challenging real-life environments with higher liquid or metal density and/or noisy RF communication environments.
EM Microelectronic is an active participant in the RFID standards community. Jim Springer will be presenting “Passive UHF RFID Sensors and Standards” at the IEEE RFID and Sensing Workshop being held in conjunction with RFID Journal Live 2012. Jim has served as co-chair for the EPCglobal® Hardware Active Tagging workgroup, co-project editor for ISO/IEC 24753, and project editor for ISO/IEC 18000-61 and ISO/IEC 18000-64.

Availability
The EM4325 is available die form and in a JEDEC-standard 8-pin TSSOP.

More information is available at www.emmicroelectronic.com [1].

Posted by Ron M. Seidel, Editorial Intern

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Links:
[1] http://www.emmicroelectronic.com