EM MICROELECTRONIC

A COMPANY OF THE **SWATCH GROUP**

18000-63 (Gen2) and 18000-64 (TOTAL) RFID IC

General Description

EM4325 is a Gen2 IC that is compliant with ISO/IEC 18000-63 and ISO/IEC 18000-64 (TOTAL). The chip offers an advanced feature set leading to a performance beyond that of standard Gen2 chips and can be either battery powered or beam powered by the RF energy transmitted from a reader. In a battery assisted passive (BAP) configuration, the EM4325 offers superior reading range and reliability compared to purely passive RFID solutions.

EM4325 includes 4096 bits of high speed non-volatile memory (EEPROM) that is organized into 64 pages with 4 words per page. The chip supports either ISO or EPC™ data structures that are compliant with EPCglobal Tag Data Standards, Version 1.10, and is delivered with a Unique Identifier (UID) to ensure full traceability.

An integrated temperature sensor is included in the EM4325 and supports the temperature range from -40°C to +60°C. The temperature sensor may be used in either purely passive or BAP applications. Temperature readings can be made on demand by a reader or the chip may be programmed to perform self-monitoring with alarm conditions.

EM4325 supports advanced applications by providing programmable external interfaces for an auxiliary function and a 4-bit I/O port. The auxiliary function may be configured as an input for tamper detection or as an output for notification of RF events to external devices. The 4-bit I/O may be configured to support 4 discrete signals or as a Serial Peripheral Interface (SPI) bus. The chip may serve as either an SPI Master device or an SPI Slave device. The programmable external interfaces allow the EM4325 to function as an RF front end and protocol handler in advanced RFID tags or embedded applications. In a passive configuration, the programmable external interfaces allow the EM4325 to serve as a SPI Master with energy harvesting and provide power to external components.

Battery supply management is provided to prolong battery life in BAP applications. The chip supports programmable duty cycle control, auto-switching between battery powered and beam powered operation, and programmable enable/disable of an ultra-low power mode for extended storage applications.

Features

⎮ ISO 18000-63 (Gen2) & 18000-64 (TOTAL) compliant

⎮ AIAG™ B-11 compliant

⎮ ATA Spec 2000 Low Memory Tag compliant

⎮ 4096-bit non-volatile memory (EEPROM)

⎮ 48-bit manufacturer programmed IC Serial Number

⎮ 352 bits for UII/EPC encoding

⎮ 3072 bits for User data / 3008 bits for TOTAL data

⎮ 128-bit Register File

⎮ BlockErase and BlockWrite commands for high speed memory transactions

⎮ BlockPermalock command for User memory

⎮ TOTAL data rates: 64, 128, 160, 256, or 320 Kbps

⎮ Coordinated Universal Time Clock (UTC)

⎮ Integrated temperature sensor: -40°C to +60°C with typical accuracy of ±1.0°C over the full range and ±0.6°C over the typical range for cold chain

⎮ Programmable monitoring and alarm conditions for temperature sensor including time stamp

⎮ Programmable auxiliary function: input for tamper detection or output for notification of RF events

⎮ Programmable 4-bit I/O port: configurable as 4 discrete signals or as a Serial Peripheral Interface (SPI) Bus

⎮ Battery assistance for superior reading range and reading reliability

⎮ Rectifier that allows purely passive operation in case the battery is flat or not present

⎮ Battery supply management to prolong battery life

⎮ Battery supply range: 1.25V to 3.6V [1]

⎮ Low battery alarm threshold: 1.3V or 2.2V

⎮ Extended temperature range: -40°C to +85°C

Note 1: EEPROM write needs min 1.8V

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FACT SHEET | EM4325
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Applications

| RFID tags:
Supply chain management, tracking and tracing, reusable containers and pallets, access control, asset control, cold chain monitoring, sensor monitoring, E-seals, Gen2 side-channel for active RFID tags

| RFID front end for embedded applications:
Gen2 communications channel for wireless data exchange, configuration and control, RF event notification

Block Diagram
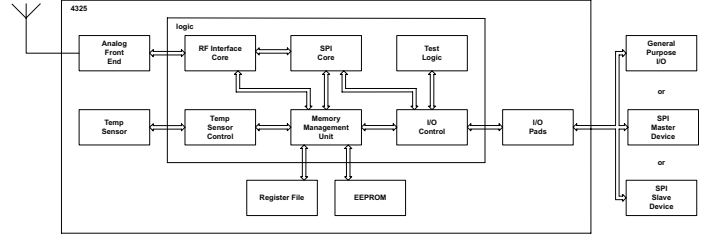
Pin Description

Pin	Name	I/O	Description
1	ANT+	A	Antenna +
2	AUX	I/O	Auxiliary Function
3	P0_MOSI	I/O	I/O P0 or SPI Master Output / Slave Input
4	P1_MISO	I/O	I/O P1 or SPI Master Input / Slave Output
5	P2_SCLK	I/O	I/O P2 or SPI Serial Clock
6	P3_CS	I/O	I/O P3 or SPI Chip Select (active low)
7	VBAT	A	External supply voltage for BAP operation
8	VSS	A	Supply return and Antenna -
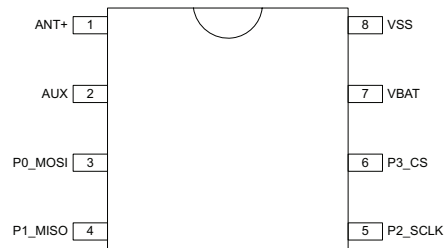
Ordering Information

The versions below are considered standard and should be readily available. For other versions or other delivery form, please contact EM Microelectronic-Marin S.A. For samples, please order exclusively from the standard versions.

Part Number	SMS	Temp Sensor Calibrated	Package / Die Form	Delivery Form
EM4325V11WS7E	No	Yes	Sawn wafer / bumped die – thickness of 7 mils	Wafer on frame
EM4325V11TP8B+	No	Yes	TSSOP8	Tape & Reel
EM4325V21WS7E	No	No	Sawn wafer / bumped die – thickness of 7 mils	Wafer on frame
EM4325V21TP8B+	No	No	TSSOP8	Tape & Reel
EM4325V26TP8B+	No	No	TSSOP8	Tape & Reel
EM4325V31TP8B+	Yes	Yes	TSSOP8	Tape & Reel
EM4325V41TP8B+	Yes	No	TSSOP8	Tape & Reel
EM4325VXY%%%			Custom	Custom

NOTE: EM4325V26TP8B+ is intended for use as a RF / analog front end for a microcontroller and it disables all RF command processing while the SPI bus functionality remains intact. This requires an external microcontroller to implement all aspects of an air interface protocol.