Features

- **Backscatter-based UHF RFID IC (860 Mhz to 960 Mhz) Supporting Current and Future Radio Regulations**
- **Support for All Data Structures Defined in ISO/IEC 18000-6, ISO/IEC 15961, ISO/IEC 15963, GTAG, ePC**
- **ATA5590 is a Passive Backscatter-communication-based Data Carrier IC**
  - **12 µW RF Power Required for Minimum Communication Feasibility**
- **Programming of the Memory Possible in Atomic and Global Mode**
  - **Dynamic Programming Time Management**
  - **Programming Range: 80% of the Read Space**
- **Programmable EAS Functionality**
- **Double-edge PIE Encoding**
- **Short, Long and Temporary Commands**
- **PSK for the Backscatter Data Stream to Achieve Highest SNR**
- **Full-duplex and Half-duplex Communication Modes**
- **Synchronous Return Link to Achieve Highest SNR**
- **ATA5590 Enables Several Closed-loop Possibilities to Enable:**
  - **Adaptive Speed During Read and Anticollision Procedures**
  - **Fast Programming**
- **Communication Speed 5 Kbit/s to 60 Kbit/s, Fully Controlled by the Reader**
  - **Different Speed Factors Possible in Forward and Return Link**
- **Two Kinds of Anticollision Procedures Implemented**
  - **Deterministic and Slotted Aloha Anticollision Procedure**
  - **Group_Selection Commands Supporting = < > Decisions**
  - **Wakeup Commands**
  - **All Procedures Support 16-Bit Random Values for Access Control Mechanisms**
- **No Unique Data Structures are Needed to Enable Both Anticollision Procedures**
  - **Parallel Handling of Different Structures and Opening of Migration Paths for Private Structures**
  - **Applications in Open Data Systems as well as in Closed Systems**
  - **Maximum ID is Limited Only by the User Memory Space (1024 Bits + 256 Bits)**
- **Both Procedures Also Support Virgin-tag Initialization During Anticollision**
- **High-efficiency Commands to Increase and Adapt Anticollision Speed**

1. Overview

ATA5590 is a wireless data carrier IC. The IC is powered by the RF field transmitted by an RFID reader. The carrier frequency is typically in the UHF region (860 MHz to 960 MHz).

The functionality of the IC is controlled by the reader.

The IC backscatters the required information back to the reader using a backscatter modulation technique; it is a passive UHF Transponder device based on the experience of the EU-funded project Palomar (IST1999-10339).

ATA5590 was created to enable applications for open data management systems also supporting old or private data structures.

1-kbit UHF R/W IDIC® with Anti-collision Function

ATA5590 TAGIDU™

Summary

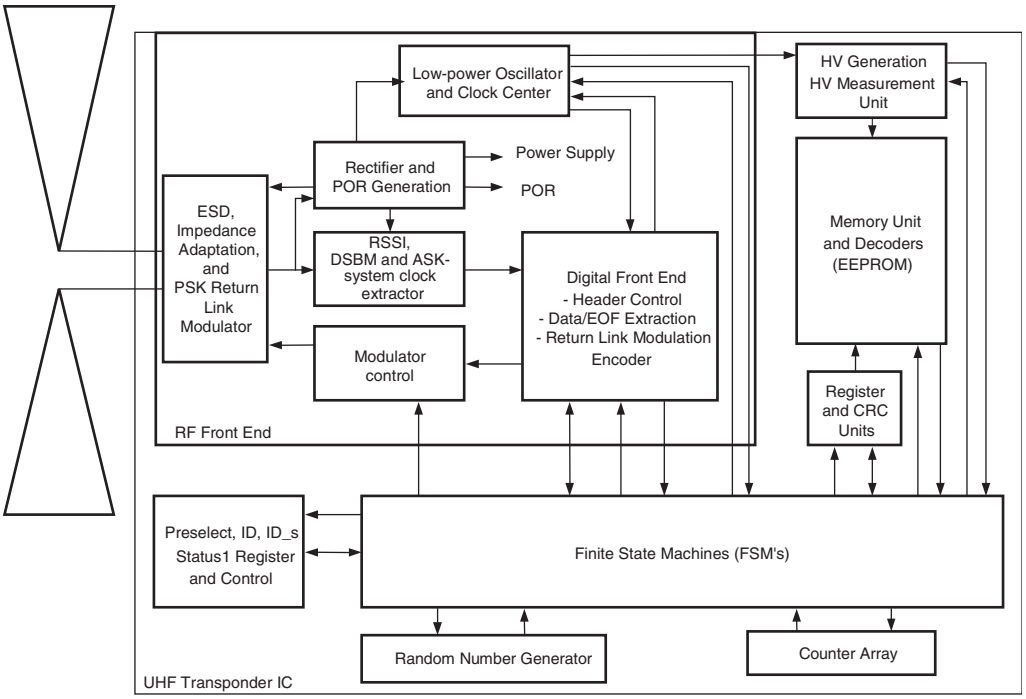
Preliminary

Rev. 4817DS–RFID–12/05

Note: This is a summary document. A complete document is available under NDA. For more information, please contact your local Atmel sales office.

2. The Structure of ATA5590

Figure 2-1. Structure of ATA5590



ATA5590 contains the following top level blocks:

- The analog front end, which extracts
  - the supply voltage for the IC from the RF beam
  - the modulation dips transmitted by the reader
  - the control signals indicating the status of the power supply
- The analog front end also contains structures for ESD protection, a low-power oscillator, and a modulator stage.
- The digital front end, which extract status signals of the link as well as the extracted symbols
- A memory block which is implemented as an EEPROM containing an on chip HV voltage generator to program the memory
- A register unit, which contains the transmitted commands and parameters
- A main finite state machine (FSM), which controls the frond end and the access mechanism.
- A random number generator, which is used to generate random values for the Aloha and tree-walker-based anticollision procedures.
- Three different persistent nodes, which are able to store the status of the anticollision routine over a certain time without any external power.

Please refer to the Application Note “Antenna Matching”.

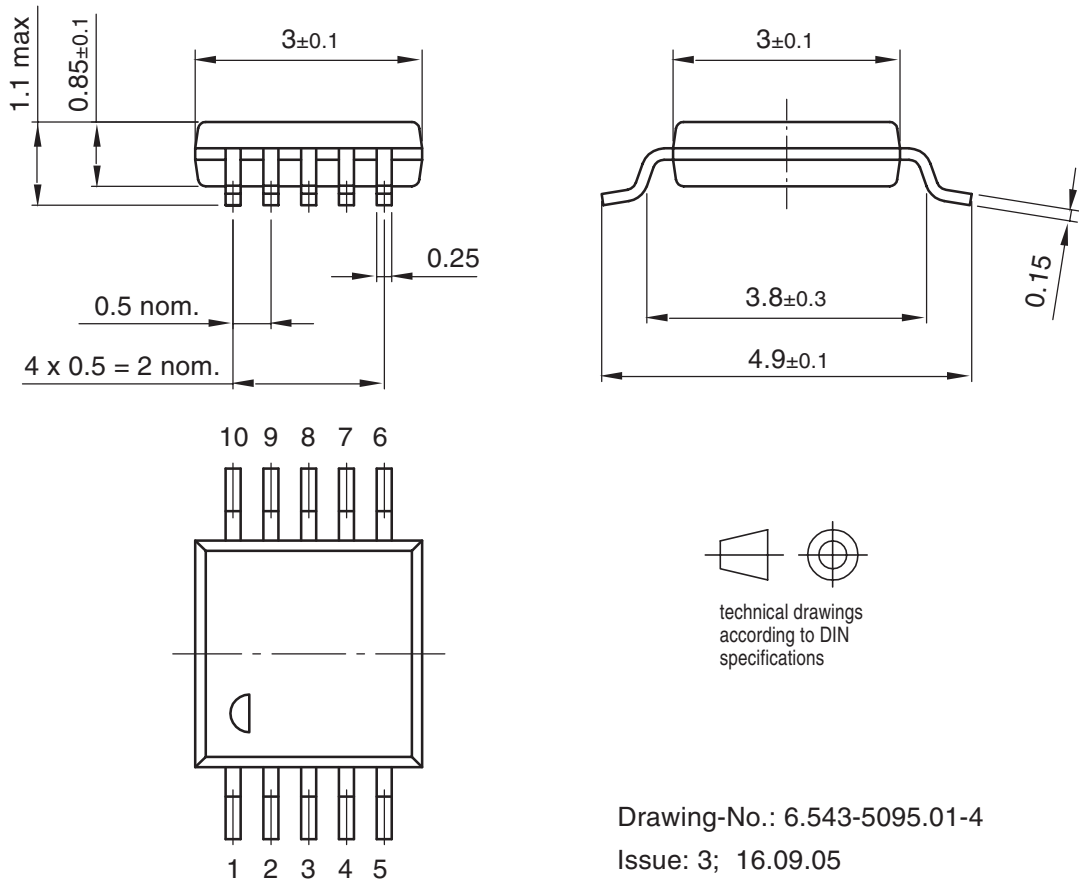
3. Ordering Information

Extended Type Number	Package	Remarks
ATA559001-DBW	6” Wafer	15 µm NiAu bumps, 300 µm wafer thickness
ATA559001-6DSY	TSSOP10	For development of tag antenna designs, Pb-free

4. Package Information

Package: TSSOP 10
(acc. to JEDEC Standard MO-187)

Dimensions in mm
Not indicated tolerances ± 0.05



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