

## Secure microcontroller with enhanced security with 2 Kbytes EEPROM and dual interface

Data brief

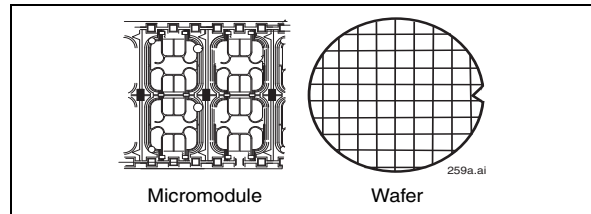
### Features

#### Hardware features

- Enhanced 8/16-bit ST23 CPU core with 16 Mbytes of linear addressable memory
- 92 Kbytes of User ROM
- 4 Kbytes of User RAM
- 0.5 Kbytes dedicated RFUART RAM
- 2 Kbytes of User EEPROM including 128 bytes of User OTP area:
  - Highly reliable CMOS EEPROM submicron technology
  - 30-year data retention at 25°C
  - 500,000 Erase/Write cycles endurance at 25° C
  - 1 to 32 byte Erase or Program in 1.5 ms
- Operating temperature: –25° to +85°C (see restricted test conditions)
- Three 8-bit timers with watchdog and interrupt capability
- 2.7V to 5.5V supply voltages
- External clock frequency up to 10 MHz
- High performance provided by:
  - CPU clock frequency up to 28 MHz
- Power-saving Standby state
- Contact assignment compatible with ISO/IEC 7816-3 standards
- Asynchronous receiver transmitter (IART) for high speed serial data support (ISO/IEC 7816-3 T=0/T=1 and EMV™ compliant)
- ESD protection greater than 5 kV (HBM)

#### Contactless features

- Complies with ISO/IEC 14443 Type A, B and B', and PayPass™ standards
- 13.56 MHz carrier frequency
- RF frame up to 512 bytes
- RFUART (RF universal asynchronous receiver transmitter) up to 848 Kbps



#### Security features

- Active shield
- Monitoring of environmental parameters
- Protection mechanisms against faults
- True random number generator (TRNG) (AIS-31 Class P2 compliant)
- 16-bit Cyclic Redundancy Check (CRC) calculation block (ISO/IEC 13239)
- Unique serial number on each die
- AES accelerator
- Three-key Triple DES accelerator (EDES+)

#### Development environment

Interface with RF readers supported through a library of embedded software functions compatible with ISO/IEC 14443 standard.

Software development and firmware generation are supported by a comprehensive set of development tools dedicated to software design and validation:

- C compiler, simulator and emulator

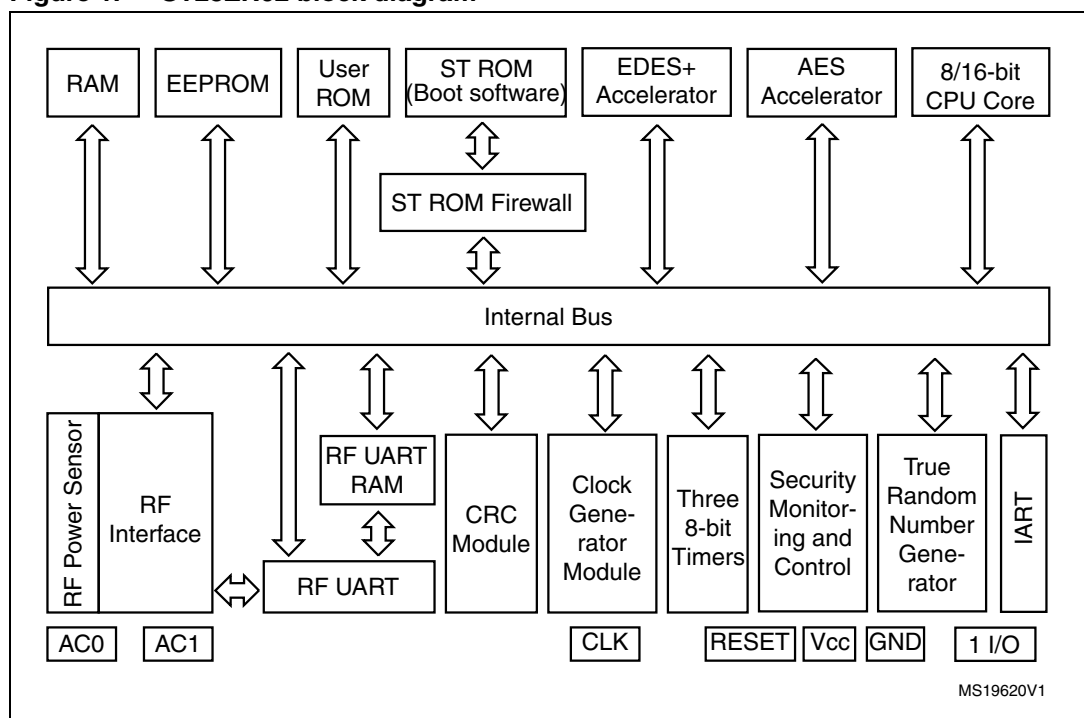
# 1 Description

ST23ZR02 products are secure microcontrollers specially designed for secure smartcard applications.

They are based on an enhanced STMicroelectronics 8/16-bit CPU core offering 16 Mbytes of linear addressing space. ST23ZR02 devices are manufactured using an advanced highly reliable ST CMOS EEPROM technology.

An RF Interface including an RF universal asynchronous receiver transmitter (RF UART) enables contactless communication up to 848 Kbps compatible with the ISO/IEC 14443-A and ISO/IEC 14443-B standard.

**Figure 1. ST23ZR02 block diagram**



## 1.1 Development environment

Development tools for smartcard products include a complete range of hardware systems and software tools from STMicroelectronics and third-party tool suppliers. The range of tools includes solutions to help you to develop and debug your application and evaluate smartcard products and their peripherals.

An Integrated Development Environment (IDE), the ST Visual Develop (STVD), provides a set of tools for developing embedded applications. This interface manages the project configuration, code edition, code generation and program debugging.

All the information needed to generate the application code and personalization will be collected in a delivery file (.DLV extension). This file is created using the Delivery menu of the STMicroelectronics configuration software tool, SCool.

## 2 Revision history

**Table 1. Document revision history**

Date	Revision	Changes
06-Jul-2011	1	Initial release.
22-Mar-2012	2	Updated the EEPROM User OTP area in <a href="#">Hardware features</a> .

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