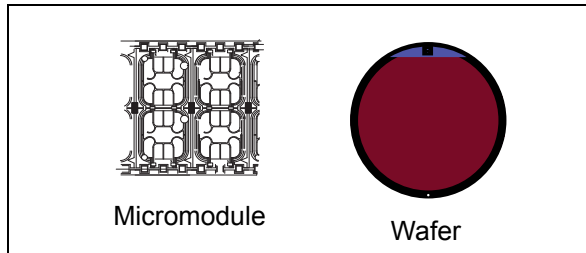


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**Secure MCU with enhanced security and 4-Kbyte EEPROM**

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Data brief

**Features****Hardware features**

- Enhanced 8/16-bit ST23 CPU core with 16 Mbytes of linear addressable memory
- 140 Kbytes of User ROM
- 4 Kbytes of User RAM
- 4 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 1.0 ms
- Operating temperature: –25° to +85°C
- Three 8-bit timers with watchdog and interrupt capability
- 1.62 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)

**Security features**

- Active shield
- Memory protection unit (MPU)
- 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
- Three-key Triple DES accelerator (EDES+)

**Development environment**

- 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

**Applications**

SB23ZE04 major applications include:

- Banking

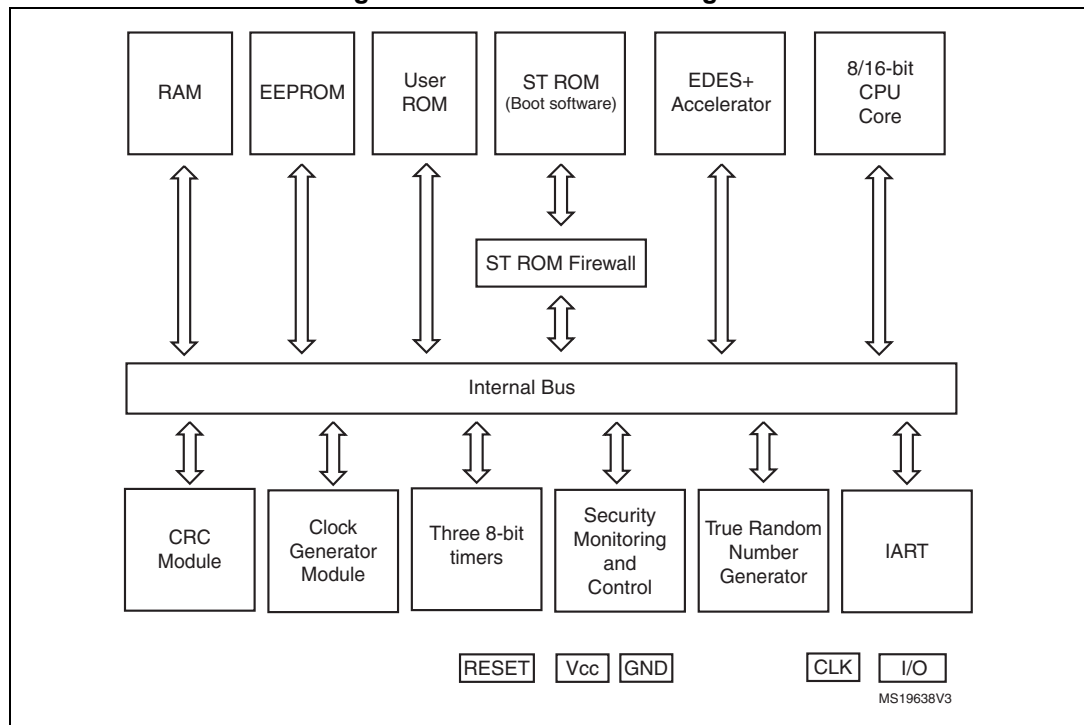
# 1 Description

SB23ZE04 devices 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. SB23ZE04 devices are manufactured using an advanced highly reliable ST CMOS EEPROM technology.

An ISO/IEC 7816-3 EMV-compliant asynchronous receiver transmitter (IART) communication peripheral is available.

Figure 1. SB23ZE04 block diagram



## 1.1 Development environment

Development tools for secure microcontroller 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
16-May-2013	1	Initial release.

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