ST23ZR02

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

Data brief

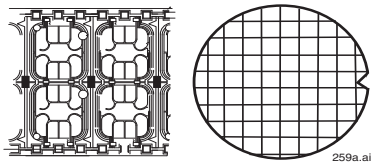
Features

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



Micromodule Wafer

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

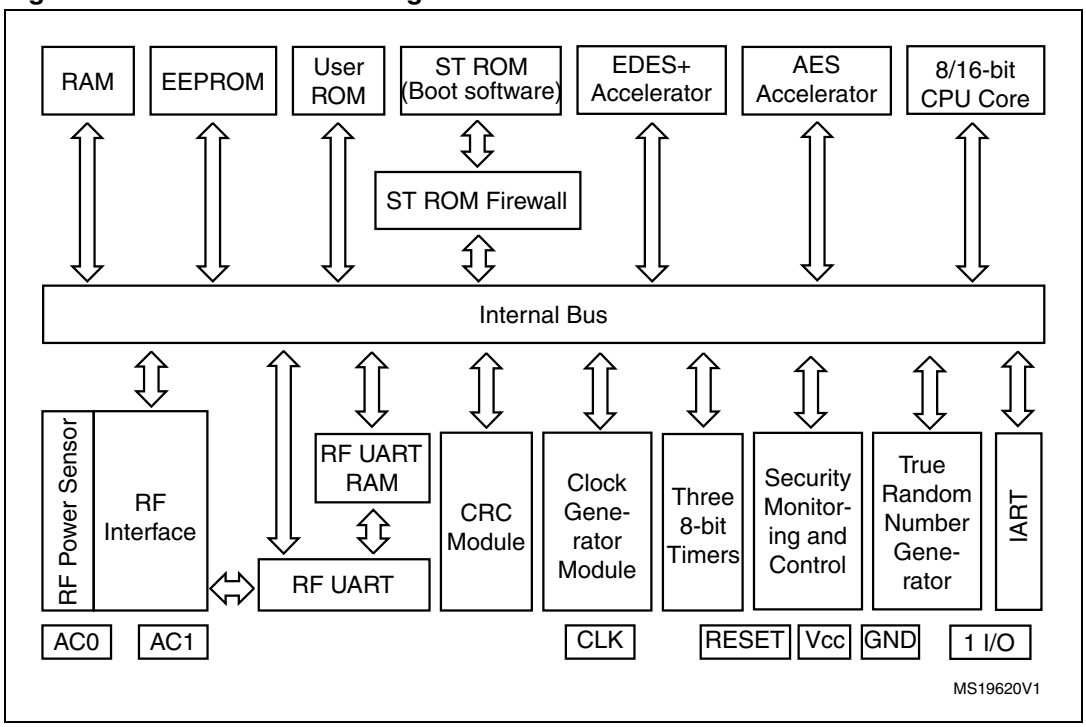
1 Description

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



LICENSED DPA COUNTERMEASURES™

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 *Hardware features*.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com