Secure MCU with 32-bit ARM Cortex™ M3 CPU and 256 Kbytes of high density Flash memory

Features

Hardware features
- ARM® Cortex™-M3 32-bit RISC core
- 8 Kbytes of user RAM
- 256 Kbytes of user Flash memory with OTP area:
  - 10-year data retention
  - 100,000 Erase/Write cycles per page
  - Page granularity of 128 Bytes
  - Block granularity: 1 Kbyte
  - 128 Bytes of OTP for user
  - Page Erase time 3 ms
  - Block Erase 1 Kbyte in 15 ms
  - Programming performance up to 10μs/byte
  - Flash Erase / Write Protection software programmable on 64 Kbyte sectors
- Asynchronous Receiver Transmitter supporting ISO 7816-3 T=0 and T=1 protocols
- Two 16-bit timers with interrupt capability
- 1.8V, 3V and 5V supply voltage ranges
- External clock frequency from 1 up to 7.5 MHz
- High performance provided by:
  - CPU clock frequency up to 20 MHz
  - External clock multiplier (2x, 3x, and 4x)
- Current consumption compatible with GSM and ETSI specifications
- Power-saving Standby state
- Contact assignment compatible ISO 7816-2
- ESD protection greater than 4 kV (HBM)

Security features
- Monitoring of environmental parameters
- Protection against faults
- ISO 3309 CRC calculation block
- True random number generator
- Unique serial number on each die
- Hardware data encryption standard (DES) accelerator

Software features
- Flash loader
- Flash drivers

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
ST32F25A major applications include:
- Mobile communications (GSM, 3G and CDMA)
- Java Card™ applications
1 Description

The ST32F25A is a serial access microcontroller designed for secure mobile applications that incorporates the most recent generation of ARM processors for embedded systems. Its Cortex™-M3 32-bit RISC core operating at a 20-MHz frequency brings great performance and excellent code compacity to the application thanks to the Thumb®-2 instruction set.

The high-speed embedded Flash 256 Kbyte memory introduces more flexibility to the system.

The ST32F25A also offers a serial communication interface fully compatible with the ISO 7816-3 standard (T=0, T=1) for smartcard applications.

Two general purpose 16-bit timers are available.

A hardware Data Encryption Standard (DES) accelerator can be used to the user to optimize the application performance. A software library is provided for Advanced Encryption Standard (AES) implementation.

The ST32F25A operates in the –25 to +85°C temperature range and 1.8 V, 3 V and 5 V supply voltage ranges. A comprehensive range of power-saving modes enables the design of efficient low-power applications.

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.
1.1 Software development tools description

Dedicated Cortex™-M3 software development tools are provided by ARM and Keil. This includes the Instruction Set Simulator (ISS) and C compiler. The documentation is available on the ARM and Keil web sites.

Moreover, STMicroelectronics provides:

- A time-accurate hardware emulator controlled by the Keil debugger and the ST development environment.
- A complete product simulator based on Keil’s ISS simulator for the Cortex™-M3 CPU.
- A ROMed Flash Loader with very high-speed software downloading capabilities.

2 Revision history

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Changes</th>
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<tbody>
<tr>
<td>12-Feb-2010</td>
<td>1</td>
<td>Initial release.</td>
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<tr>
<td>05-Mar-2013</td>
<td>2</td>
<td>Changed document classification from Smartcard Restricted Distribution to Public.</td>
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</table>
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