

# PRODUCT BRIEF (S3C89K8)

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## High Performance and Low Power Consumption contact/contactless Smart Card Microcontroller

The S3C89K8 single-chip CMOS microcontroller is specially designed and packaged for "contact/contact less smart card" application. The SAM87RC 8-Bit CPU architecture supports Stop and Idle power-down modes to reduce power consumption. The S3C89K8 has SAM87RC 8-Bit CPU, 24K bytes of program memory (ROM), 8K bytes of program/data memory (EEPROM), 272-byte general-purpose register file and 512-byte static RAM.

### HARDWARE FEATURES

#### CPU

- SAM87RC 8-bit CPU core
- 78 instructions, including multiply and divide
- STOP and IDLE instructions added to reduce power consumption

#### Memory

- 24K bytes of ROM for program memory
- 8K bytes of EEPROM for program/data memory
- 512 bytes static RAM for program/data memory
- 272 bytes for general-purpose register file

#### EEPROM Write Operations

- Programmable EEPROM erase/write time
- Byte-wise to page-wise (32 bytes) EEPROM erase/write operations are supported
- 1,000,000 erase/write cycles
- 100 years data retention

#### Data Security

- Invisible ROM code due to implantation
- 32 bytes security PROM, hardware protected
- 32 bytes non erasable EEPROM
- Unique serial number for each chip
- Reset operations are selective if abnormal voltage/frequency/temperature/light exposure/decapsulation is detected.

#### Interrupts

- Two interrupt sources and vectors

#### RESET

- Power-on reset circuit
- External reset circuit

#### DES (Data Encryption Standard)

- Built-in triple DES logic
- Encryption / Decryption
- Start and Stop control

#### 16-bit Random Number Generator

- One 16-bit random number generator with internal ring oscillator
- Start and stop control

#### Automatic Operating Mode Detect

- Contact/Contactless

#### Contactless Specific Features

- 13.56 MHz operation
- 106 Kbps or higher data transfer rate
- 10% or 100% ASK demodulation
- Load modulation
- Programmable RF interface parameters
- ISO14443 (type B)

#### Contact Specific Features

- Operating voltage: 2.7 - 5.5 V
- ISO 7816-3 compatible
- Operating frequency: 1 - 5 MHz

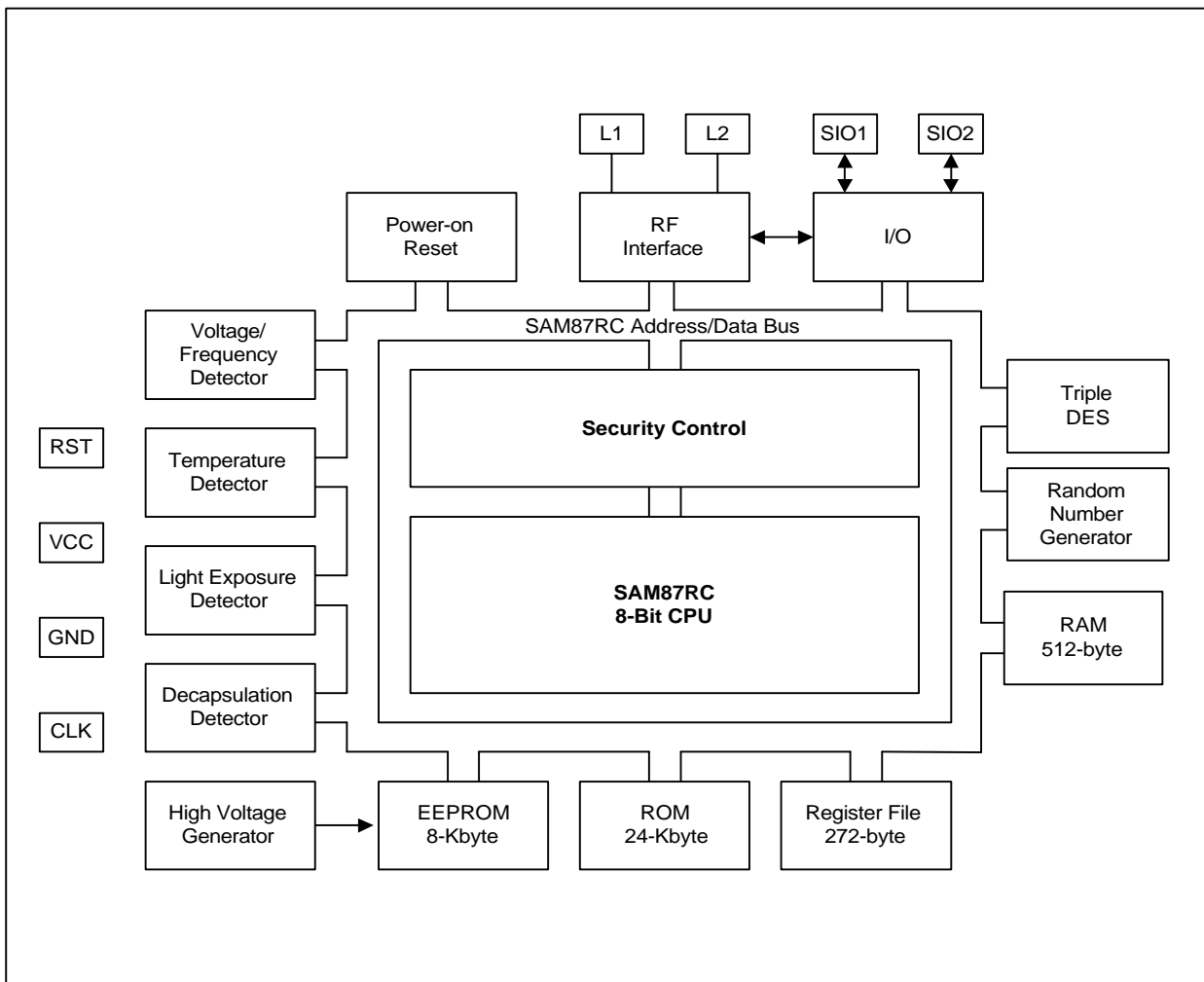
#### Operating Temperature

- -25 °C to +85 °C

#### Package

- Wafer
- 8-pin COB (conforms to ISO standard 7816)

## S3C89K8 Block Diagram



### Electrical Characteristics

- Supply voltage:  $-0.3$  to  $+7.0$  V
- Operating temperature:  $-25$  °C to  $+85$  °C
- Operating voltage:  $2.7 - 5.5$  V
- Supply current :
  - contact (@3.57MHz, 5V) 3.5mA(typical)
  - contactless(@3.57MHz, 3V) 1mA(typical)
- Stop current(5V) :0.5mA(typical)

### Development Tools

- In-Circuit Emulator: OPENice-i500
- C Compiler: IAR C-Compiler
- Simulator
- Emulation Board

### For More Information

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