# PRODUCT BRIEF (S3C49C9)

## High Performance and Low Power Consumption Smart Card Microcontroller

The S3C49C9 single-chip CMOS micro-controller is specially designed and packaged for "Smart Card" application. The S3C49C9 is built around an outstanding CPU core: the 16/32 bit ARM7TM RISC processor. The S3C49C9 has 96K bytes of program memory (ROM), 32K bytes of program/data memory (EEPROM), 4K bytes of data memory (RAM), and advanced security features. The S3C49C9 is fully compatible with ISO 7816 standard for smart card applications.

## HARDWARE FEATURES

### CPU

- ARM7TM 32-bit CPU core
- ? Fully 16/32-bit RISC architecture

### Memory Allocation

- 96K bytes ROM
- ? 32K bytes EEPROM
- ? 4K bytes RAM

### EEPROM Write Operations

- ? 2ms fast erase/write time
- ? 1 to 64 bytes EEPROM erase/write operation
- ? 1,000,000 write/erase cycles (typical)
- ? 100 years data retention (typical)

### Data Security

- ? 64 bytes write protected security area including transport code
- ? 64 bytes of non erasable EEPROM
- ? Reset operation are selective if abnormal voltage/frequency/temperature/light exposure/decapsulation are detected.

### Interrupt Controller

- ? 4 interrupt sources

### Serial I/O Interface

- ? Two asynchronous half-duplex character receive/transmit serial interface (conforms to ISO standard 7816-3)

### Timers

- ? One 16-bit programmable interval timer
- ? One 16-bit watchdog timer

### Memory Protection Unit

- ? Divide into 8 memory areas with own access permission attributes

### Random Number Generator

- ? One 16-bit random number generator
- ? Start/Stop control

### Internal Clock generator

- ? Internal RC clock generator (average 5MHz)

### Reset

- ? Power-on reset and external reset

### Operating Voltage Range

- ? 2.7 V–5.5 V

### Operating Frequency Range
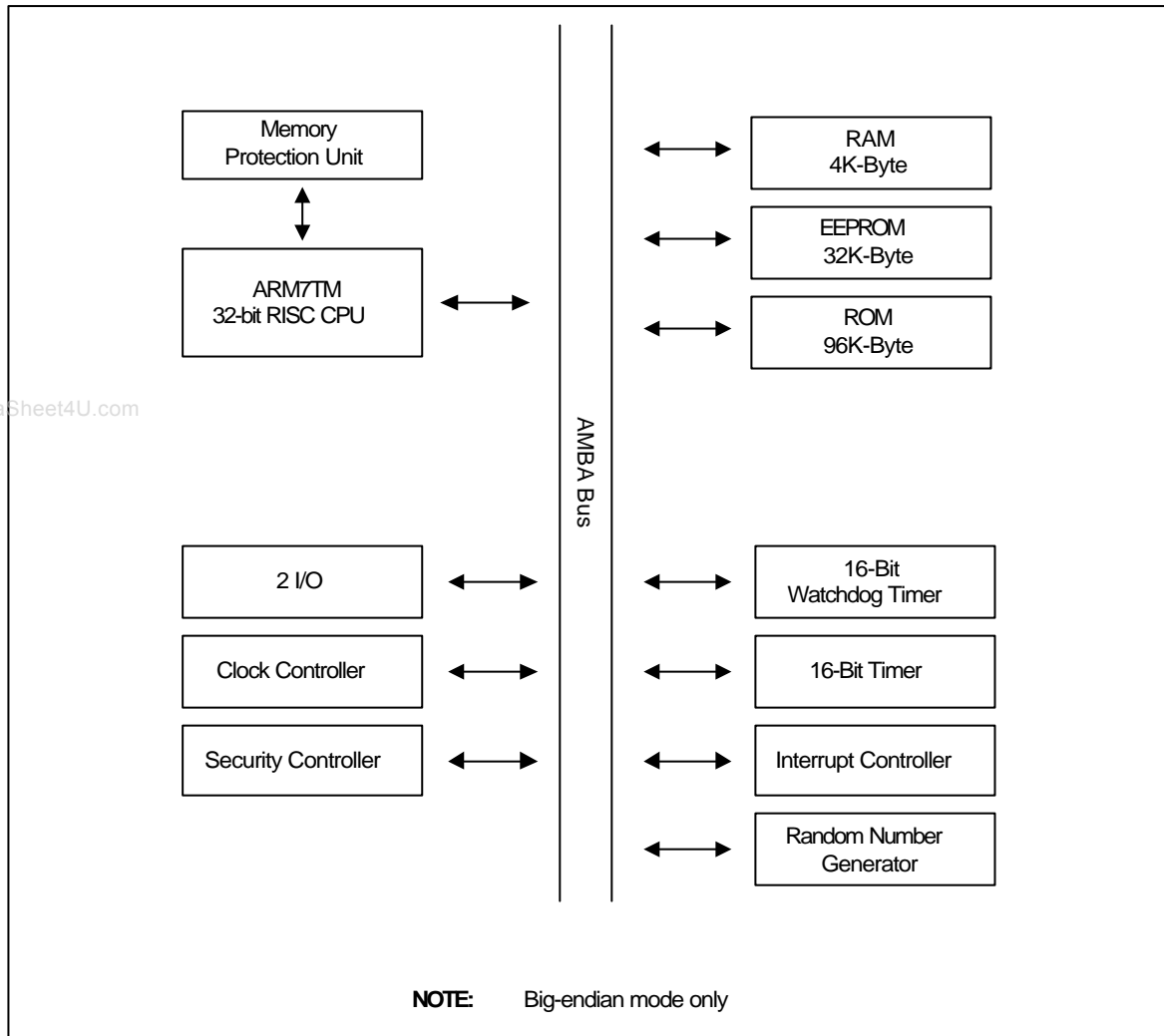
- ? 1 MHz–5 MHz (external clock)

### Operating Temperature

- ? – 25 ?C to 85 ?C

### Package

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

## S3C49C9 Block Diagram

```
+----------------------------------------------------------------------+
|                                                                      |
|    +------------------+              +------------------+            |
|    |     Memory       |              |      RAM         |            |
|    | Protection Unit  |      <-->    |    4K-Byte       |            |
|    +------------------+              +------------------+            |
|           ^                          +------------------+            |
|           |                   A      |     EEPROM       |            |
|           v                   M      |    32K-Byte      |            |
|    +------------------+        B      +------------------+            |
|    |    ARM7TM        |       A      +------------------+            |
|    | 32-bit RISC CPU  |  <-->        |      ROM         |            |
|    +------------------+        B      |    96K-Byte      |            |
|                                u      +------------------+            |
|                                s                                     |
|    +------------------+              +------------------+            |
|    |      2 I/O       |  <-->   <--> |     16-Bit       |            |
|    +------------------+              | Watchdog Timer   |            |
|    +------------------+              +------------------+            |
|    | Clock Controller |  <-->   <--> |   16-Bit Timer   |            |
|    +------------------+              +------------------+            |
|    +------------------+              +------------------+            |
|    |Security Controller| <-->   <--> | Interrupt Controller|        |
|    +------------------+              +------------------+            |
|                                      +------------------+            |
|                                 <--> | Random Number    |            |
|                                      |   Generator      |            |
|                                      +------------------+            |
|                                                                      |
|              NOTE:      Big-endian mode only                         |
+----------------------------------------------------------------------+
```

### Electrical Characteristics

- Operating voltage maximum ratings: – 0.3  to  + 7.0 V
- Operating temperature: – 25 ?C  to + 85 ?C
- Operating voltage: 2.7 – 5.5 V
- Operating current(@5MHz, 5.5V) :10mA(Max)
- Stop current(@1MHz, 5.5V) :200uA(Max)

### Development Tools

- In-Circuit Emulator: MultiICE
- C Compiler: SDT(Software Development Toolkit)
                ADS (ARM developer Suite)
- Emulation Board

### For More Information

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