Security & Chip Card ICs

SLE 44C24S

8-bit Security Controller with
26-Kbyte ROM, 256 byte-RAM, 512-byte XRAM,
2-Kbyte EEPROM and Sleep Mode

Short Product Information 10.01

SLE 44C24S Short Product Information	Ref.: SPI_SLE 44C24S_1001
This document contains preliminary information on a new product under development. Details are subject to change without notice.	
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Infineon Technologies is an approved CECC manufacturer.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office in Germany or our Infineon Technologies Representatives world-wide (see address list).

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8-bit Security Controller with 26-Kbyte ROM, 256-byte RAM, 512-byte XRAM, 2-Kbyte EEPROM and Sleep Mode

Features

- 8-bit microcomputer in CMOS technology
- Instruction set opcode compatible with standard SAB8051 processor
- Dedicated, non-standard architecture with execution time less than half of standard
- SAB 8051 processor
- **24-Kbyte User ROM** for application programs
- 2-Kbyte manufacturer ROM for **C**hip **M**anagement **S**ystem (CMS)
- **2-Kbyte EEPROM** as program/data memory
- 256-byte RAM
- 512-byte XRAM
- Power saving sleep mode
- Cold-/warm reset detection
- Clock freq. = int. freq.:
  1 to 5 MHz[1] at 5 V ± 10 %,
  1 to 4 MHz at 3 V ± 10 %
- Contact configuration and serial interface in accordance with ISO 7816
- Supply voltage range: 2.7 V to 5.5 V
- < 10 mA supply current at 5 MHz
- Temperature range: – 25 to + 70 °C. [2]
- ESD protection larger than 4 kV

Document References

- Confidential Data Book SLE 44CxxS
- Instruction Set SLE44CxxS – Quick Reference
- Qualification report
- Chip delivery specification for wafer with chip-layout (die size, orientation,...)
- Module specification containing description of package, etc.
- Qualification report module

Development Tools Overview

- Short Product Information Software

EEPROM

- Reading, erasing and writing byte by byte
- Flexible page mode for 1 to 8 bytes write/erase operation
- 32 bytes security area
- Write time 3.5 ms, erase time 1.75 ms
- Frequency-adaptable programming time
- Minimum of 500,000 write/erase cycles[3]
- Data retention for minimum of ten years.
- EEPROM programming voltage generated on chip

Security Features

- ROM code not visible due to implantation
- Low voltage sensor
- High voltage sensor
- Low-frequency sensor
- High-frequency protection
- 16 bytes security PROM, hardware protected
- Unique chip identification number for each chip

CMS

- Intelligent write/erase routines for N bytes programming (0 < N < 256)
- Two serial interface modes according to ISO 7816-3:
  – 9600 bit/s related to 3.57 MHz
  – 9600 bit/s related to 4.91 MHz

Support

- HW-& SW-Tools (Emulator, Card Emulator, Simulator)
- Application notes

Supported Standards

- ISO/IEC 7816
- EMV 2000
- GSM 11.1x
- ETS I TS 102 221

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1) Extended frequency range up to 7.5 MHz is available, see ordering information.
2) Extended temperature range is available for certain applications, e.g. GSM, see ordering information.
3) Values are temperature dependent for further information please refer to your Infineon Technologies Sales Office.

Development Kit SDK CC

Ordering Information

Type	Package[1]	Voltage Range	Temperature Range	Frequency Range
SLE 44C20S-M4	M4	2.7 V - 5.5 V	– 25°C to + 70°C	1 MHz - 5 MHz @ 5 V
SLE 44C20S -C	C			1 MHz – 4 MHz @ 3V
SLE 44C20S -T85-M4	M4	2.7 V - 5.5 V	– 25°C to + 85°C	1 MHz - 5 MHz @ 5 V
SLE 44C20S -T85-C	C			1 MHz – 4 MHz @ 3V
SLE 44C20S -V5-M4	M4	4.5 V - 5.5 V	– 25°C to + 70°C	1 MHz - 5 MHz
SLE 44C20S -V5-C	C			
SLE 44C20S -V5-T85-M4	M4	4.5 V - 5.5 V	– 25°C to + 85°C	1 MHz - 5 MHz
SLE 44C20S -V5-T85-C	C			
SLE 44C20S -V5-F7-M4	M4	4.5 V - 5.5 V	– 25°C to + 70°C	1 MHz - 7.5 MHz
SLE 44C20S -V5-F7-C	C			

Pin Description

[1] available as wire-bonded module (M4) for embedding in plastic cards, as die (C) for customer packaging or on request as SMT package (S)

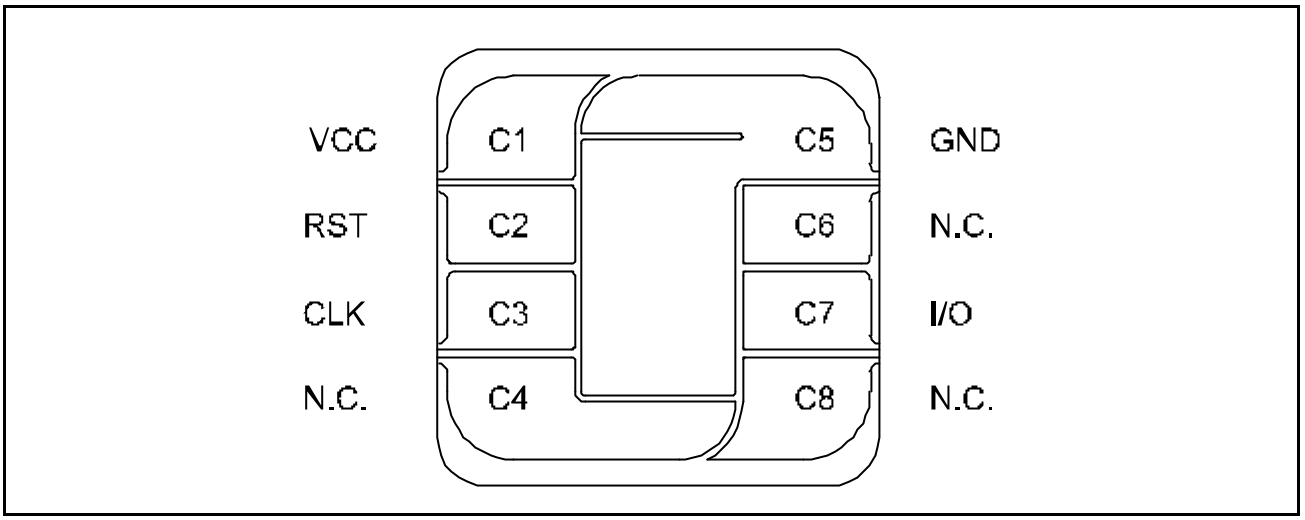

Figure 1 Pin Configuration (top view)

Pin Definitions and Functions

Card Contact	Symbol	Function
C1	VCC	Operating voltage
C2	RST	Reset input
C3	CLK	Processor clock input
C5	GND	Ground
C4;C6,C8	N.C.	Not connected
C7	I/O	Bi-directional data port

General Description

SLE 44C24S is a member of the Infineon Technologies security controller family produced in 0.6 µm CMOS technology. The CPU provides the high efficiency of the SAB 8051 instruction set together with enhanced performance and a new level of security features.

The controller IC offers 24 Kbytes of User-ROM, 256 bytes internal RAM, 512 bytes XRAM and 2 Kbytes EEPROM. To minimize the overall power consumption, the chip card controller IC offers a sleep mode.

SLE 44C24S offers high performance and large memory sizes combined with outstanding security features on a minimized chip size. Therefore the device fulfills all chip card requirements and is especially well fitting for payment, loyalty, health care and access control.