Security & Chip Card ICs

SLE 44C20S

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

Short Product Information 07.99

SLE 44C20S Short Product Information	
Revision History:	**Current Version 07.99**
Previous Releases:	2.0 (06.98)
Page	Subjects (changes since last revision)
	Layout change

Important: Further information is confidential and on request. Please contact:
Infineon Technologies AG in Munich, Germany,
Security & Chip Card ICs,
Fax +49 89 234-28925

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St.-Martin-Strasse, D-81541 München

Attention please!

The information herein is given to describe certain components and shall not be considered as warranted characteristics.

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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).

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

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8-bit Security Controller with 17-Kbyte ROM, 256-byte RAM, 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
- **15-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
- Power saving sleep mode
- 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

EPROM

- 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

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1) Extended frequency range up to7.5 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.

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 1 MHz – 4 MHz @ 3V
SLE 44C20S -C	C			
SLE 44C20S -S	S			
SLE 44C20S -T85-M4	M4	2.7 V - 5.5 V	– 25°C to + 85°C	1 MHz - 5 MHz @ 5 V 1 MHz – 4 MHz @ 3V
SLE 44C20S -T85-C	C			
SLE 44C20S -T85-S	S			
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-S	S			
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-T85-S	S			
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			
SLE 44C20S -V5-F7-S	S			

[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)

Pin Description

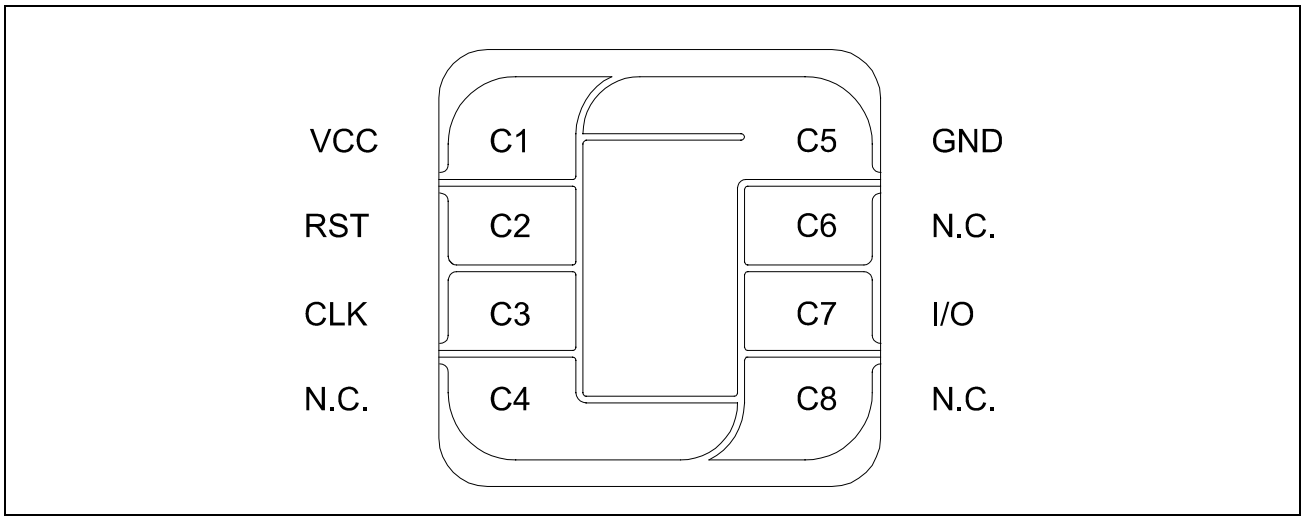

Figure 1 Pin Configuration (top view)

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 44C20S is a member of the Infineon Technologies 44 security microcontroller series, especially designed for smart card applications. The device is fabricated in a Infineon Technologies proprietary CMOS technology, resulting in a significant reduction of die size. New features such as low voltage operation, extended page mode and I/O routines offer additional performance required in applications like 3V SIM cards for GSM, banking, health care, loyalty or electronic purses.