



Security & Chip Card ICs

SLE 66C20S

16-bit Security Controller with
32-Kbyte ROM, 1280 Byte RAM and
2-Kbyte EEPROM

SLE 66C20S Short Product Information	
Revision History: Current Version 06.99	
Previous Releases: 1.0 (01.09.98)	
Page	Subjects (changes since last revision)
	Layout change

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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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16-bit Security Controller with 32-Kbyte ROM, 1280 Byte RAM and 2-Kbyte EEPROM

Features

- 16-bit microcomputer in 0.6 μm CMOS technology
- Instruction set opcode compatible with standard SAB 8051 processor
- Enhanced 16-bit arithmetic
- Additional powerful instructions optimized for chip card applications
- Dedicated, non-standard architecture with **execution time six times faster** than standard SAB 8051 processor
- **31.5-Kbytes User ROM** for application programs
- 512-bytes reserved ROM for Resource Management System (RMS) with intelligent write/erase routines
- **2-Kbytes EEPROM** as program/data memory
- **1280 bytes RAM**
- **True random number generator (RNG)**
- **Interrupt module for I/O interface**
- **CRC Module**
- **16-bit timer with 8-bit prescaler**
- Power saving sleep mode
- Clock freq. = int. freq.: 1 to 7.5 MHz
- Contact configuration and serial interface in accordance with ISO 7816
- Supply voltage range: 2.7 V to 5.5 V
- Current consumption < 10 mA at 5 MHz and 5.5 V
- Temperature range: -25 to +70°C
- ESD protection larger than 4 kV
- Software compatible with SLE 44C20S and SLE 44C24S

EEPROM

- Reading, erasing and writing byte by byte
- Flexible page mode for 1 to 16 bytes write/erase operation
- 32 bytes security area
- Write time 3.62 ms, erase time 1.81 ms
- Programming time adaptable to clock frequency
- **Minimum of 500,000 write/erase cycles**
- Data retention for a minimum of ten years
- EEPROM programming voltage generated on chip

Security Features

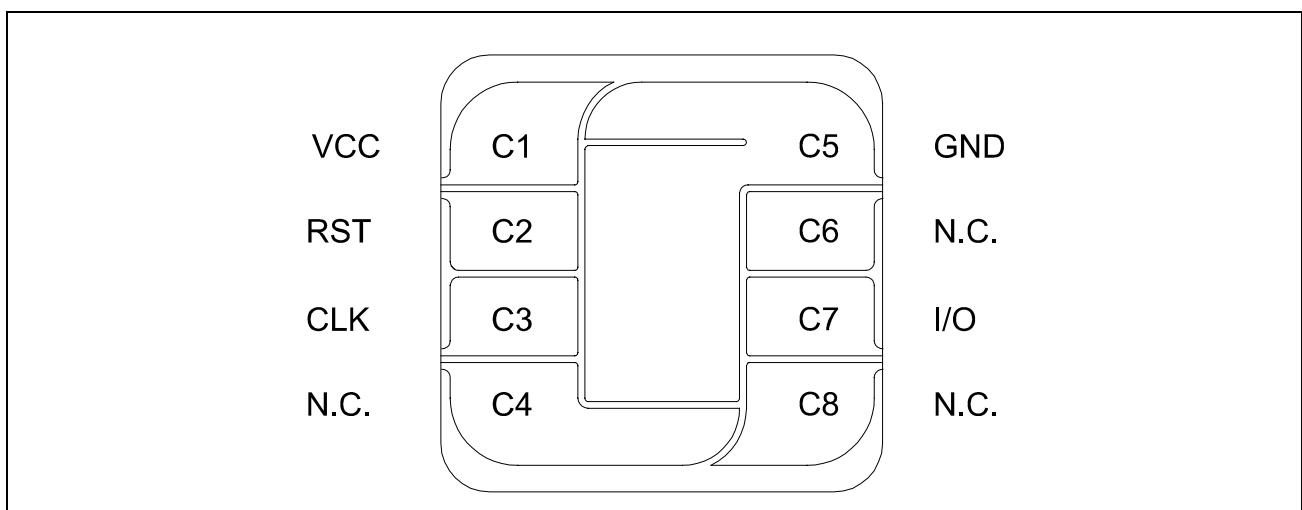
- ROM code not visible due to implantation
- Low and high voltage sensors
- Low-frequency sensor
- High-frequency filter
- Internal power-on-reset
- 16 bytes security PROM, hardware protected
- Unique chip identification number for each chip
- Security optimized layout
- Additional security features

Support

- Tools
- Application notes (e.g.: T=0, T=1, DES, RSA etc.)

Ordering Information

Type	Package ¹	Voltage Range	Temperature Range	Frequency Range
SLE 66C20S	M4	2.7 V - 5.5 V	– 25°C to + 70°C	1 MHz - 5 MHz @ 5V 1 MHz - 4 MHz @ 3V
SLE 66C20S	C			
SLE 66C20S-T85	M4	2.7 V - 5.5 V	– 25°C to + 85°C	1 MHz - 5 MHz @ 5V 1 MHz - 4 MHz @ 3V
SLE 66C20S-T85	C			
SLE 66C20S-V5	M4	4.5 V - 5.5 V	– 25°C to + 70°C	1 MHz - 5 MHz
SLE 66C20S-V5	C			
SLE 66C20S-V5-T85	M4	4.5 V - 5.5 V	– 25°C to + 85°C	1 MHz - 5 MHz
SLE 66C20S-V5-T85	C			
SLE 66C20S-V5-F7	M4	4.5 V - 5.5 V	– 25°C to + 70°C	1 MHz - 7.5 MHz
SLE 66C20S-V5-F7	C			

Pin Description

Figure 1 Pin Configuration (top view)

¹ available as wire-bonded module (M4) for embedding in plastic cards or as die (C) for customer packaging

Pin Definitions and Functions

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

General Description

SLE 66C20S is a member of the Infineon Technologies high-end security controller family in 0.6 μm CMOS technology. The CPU provides the high efficiency of the SAB 8051-instruction set extended by additional powerful instructions together with enhanced performance, memory sizes and security features.

The controller IC offers 31.5 Kbytes of User-ROM, 256 bytes internal RAM, 1 Kbyte XRAM and 2 Kbytes EEPROM. It suits the requirements of the new generation of operating systems.

The random number generator (RNG) is able to supply the CPU with true random numbers on all conditions. The CRC module allows the easy generation of checksums according to ISO 3309 (16-Bit-CRC). The timer makes it easy to implement advanced communication protocols such as T=1 and all other time critical processes. An additional interrupt capability of the I/O module allows parallel operation of chip card and terminal. To minimize the overall power consumption, the chip card controller IC offers a sleep mode.

As an important measure, the chip provides a new and enhanced level of on-chip security features.

In conclusion, the SLE 66C20S fulfills the requirements of all chip card applications, as especially Loyalty, Leisure Cards, Health Care, Banking, Access Control and prepaid SIM Cards for GSM Phones. The SLE 66C20S is a powerful chip card controller IC integrating outstanding memory sizes, additional peripherals in combination with enhanced performance and optimized power consumption on a minimized die size. Therefore, the SLE 66C20S offers the basis for new chip card applications.