



## Security & Chip Card ICs

### SLE 44C42S

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

<b>SLE 44C42S Short Product Information</b>	
<b>Revision History: Current Version 07.99</b>	
Previous Releases: 2.0 (06.98)	
Page	Subjects (changes since last revision)
	Layout change

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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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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, 4-Kbyte EEPROM and Sleep Mode

### Features

- 8-bit microcomputer in CMOS technology
- Instruction set opcode compatible with standard SAB8051 processor
- Software compatible with SLE 44C40
- 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 **Chip Management System (CMS)**
- **4-Kbyte EEPROM** as program/data memory
- 256-byte RAM
- Power saving sleep mode
- Clock freq. = int. freq.:  
     1 to 5 MHz<sup>1)</sup> at 5 V ± 10 %,  
     1 to 4 MHz at 3 V ± 10 %
- Contact configuration and serial interface in accordance with ISO7816
- Supply voltage range: 2.7 V to 5.5 V
- < 10 mA supply current at 5 MHz
- Temperature range: – 25 to + 70 °C <sup>2)</sup>
- ESD protection larger than 4 kV

### 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 3.5 ms, erase time 1.75 ms
- Frequency-adaptable programming time
- Minimum of 500,000 write/erase cycles<sup>3)</sup>
- 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

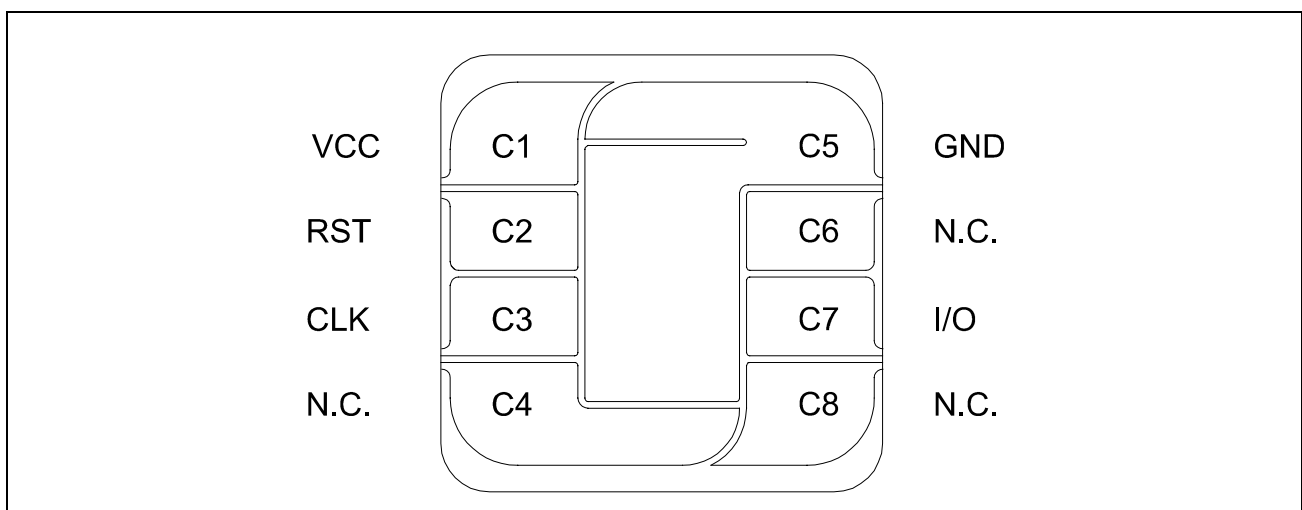
<sup>1)</sup> Extended frequency range up to 7.5 MHz is available, see ordering information.

<sup>2)</sup> Extended temperature range is available for certain applications, e.g. GSM, see ordering information.

<sup>3)</sup> Values are temperature dependent, for further information please refer to your Infineon Technologies Sales Office.

**Ordering Information**

Type	Package <sup>1</sup>	Voltage Range	Temperature Range	Frequency Range
SLE 44C42S-M4	M4	2.7 V - 5.5 V	– 25°C to + 70°C	1 MHz - 5 MHz @ 5V 1 MHz – 4 MHz @ 3V
SLE 44C42S -C	C			
SLE 44C42S -T85-M4	M4	2.7 V - 5.5 V	– 25°C to + 85°C	1 MHz - 5 MHz @ 5V 1 MHz – 4 MHz @ 3V
SLE 44C42S -T85-C	C			
SLE 44C42S -V5-M4	M4	4.5 V - 5.5 V	– 25°C to + 70°C	1 MHz - 5 MHz
SLE 44C42S -V5-C	C			
SLE 44C42S -V5-T85-M4	M4	4.5 V - 5.5 V	– 25°C to + 85°C	1 MHz - 5 MHz
SLE 44C42S -V5-T85-C	C			
SLE 44C42S -V5-F7-M4	M4	4.5 V - 5.5 V	– 25°C to + 70°C	1 MHz - 7.5 MHz
SLE 44C42S -V5-F7-C	C			

**Pin Description**

**Figure 1 Pin Configuration (top view)**

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

**Pin Definitions and Functions**

<b>Card Contact</b>	<b>Symbol</b>	<b>Function</b>
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 44C42S is a member of the Infineon Technologies 44 security microcontroller family, especially designed for smart card applications. The devices fabricated in an Infineon Technologies proprietary CMOS technology, resulting in a significant reduction of die size compared to the SLE 44C40. 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, security access or loyalty, while maintaining software compatibility to the SLE 44C40.