



## Security & Chip Card ICs

### SLE 44C80S

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

|                                                   |                                        |
|---------------------------------------------------|----------------------------------------|
| <b>SLE 44C80S 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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## 8-bit Security Controller with 17-Kbyte ROM, 256-byte RAM, 8-Kbyte EEPROM and Sleep Mode

### Features

- 8-bit microcomputer in CMOS technology
- Instruction set opcode compatible with standard SAB8051 processor
- Software compatible with SLE 44C80
- 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)**
- **8-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 32 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.

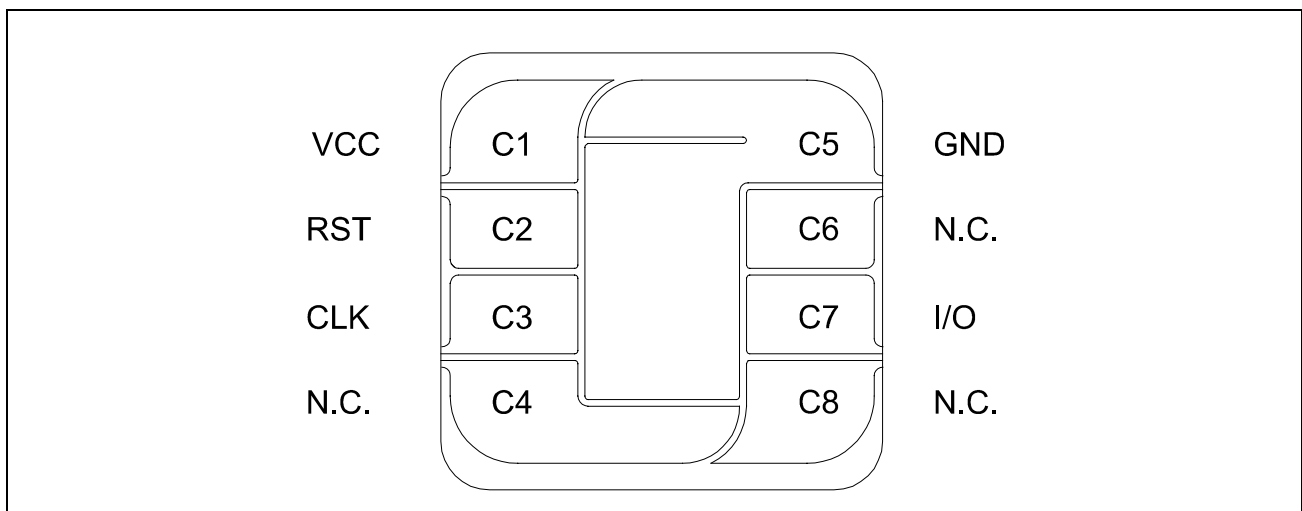
<sup>2)</sup> Extended temperature range is available for certain applications, e.g. GSM, see ordering information

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

## Ordering Information

| Type                  | Package <sup>1</sup> | Voltage Range | Temperature Range | Frequency Range                          |
|-----------------------|----------------------|---------------|-------------------|------------------------------------------|
| SLE 44C80S-M4         | M4                   | 2.7 V - 5.5 V | – 25°C to + 70°C  | 1 MHz - 5 MHz @ 5V<br>1 MHz – 4 MHz @ 3V |
| SLE 44C80S -C         | C                    |               |                   |                                          |
| SLE 44C80S -T85-M4    | M4                   | 2.7 V - 5.5 V | – 25°C to + 85°C  | 1 MHz - 5 MHz @ 5V<br>1 MHz – 4 MHz @ 3V |
| SLE 44C80S -T85-C     | C                    |               |                   |                                          |
| SLE 44C80S -V5-M4     | M4                   | 4.5 V - 5.5 V | – 25°C to + 70°C  | 1 MHz - 5 MHz                            |
| SLE 44C80S -V5-C      | C                    |               |                   |                                          |
| SLE 44C80S -V5-T85-M4 | M4                   | 4.5 V - 5.5 V | – 25°C to + 85°C  | 1 MHz - 5 MHz                            |
| SLE 44C80S -V5-T85-C  | C                    |               |                   |                                          |
| SLE 44C80S -V5-F7-M4  | M4                   | 4.5 V - 5.5 V | – 25°C to + 70°C  | 1 MHz - 7.5 MHz                          |
| SLE 44C80S -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**

| 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 44C80S is a member of the Infineon Technologies 44 security microcontroller family, especially designed for smart card applications. The device is fabricated in an Infineon Technologies proprietary CMOS technology, resulting in a significant reduction of die size compared to the SLE 44C80. 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, pay-TV or security access while maintaining software compatibility to the SLE 44C80.