



Security & Chip Card ICs

SLE 44C84S

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

| | |
|--|--|
| SLE 44C84S 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

Published by Infineon Technologies AG i.Gr., CC Applications Group
St.-Martin-Strasse, D-81541 München
© Infineon Technologies AG i.Gr. 1999
All Rights Reserved.

Attention please!

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

Terms of delivery and rights to technical change reserved.

We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

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.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

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

Features

- 8-bit microcomputer in 0.6 μm CMOS technology
- Instruction set opcode compatible with standard SAB 8051 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 **Chip Management System (CMS)**
- **8-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 MHz¹⁾ at 5 V \pm 10 %,
 - 1 to 4 MHz at 3 V \pm 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

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 cycles³⁾
- Data retention for minimum of ten years
- EEPROM programming voltage generated on chip

Security Features

- Security optimized layout
- Internal power on reset
- Low voltage sensor
- High voltage sensor
- Low-frequency sensor
- High-frequency filter
- 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

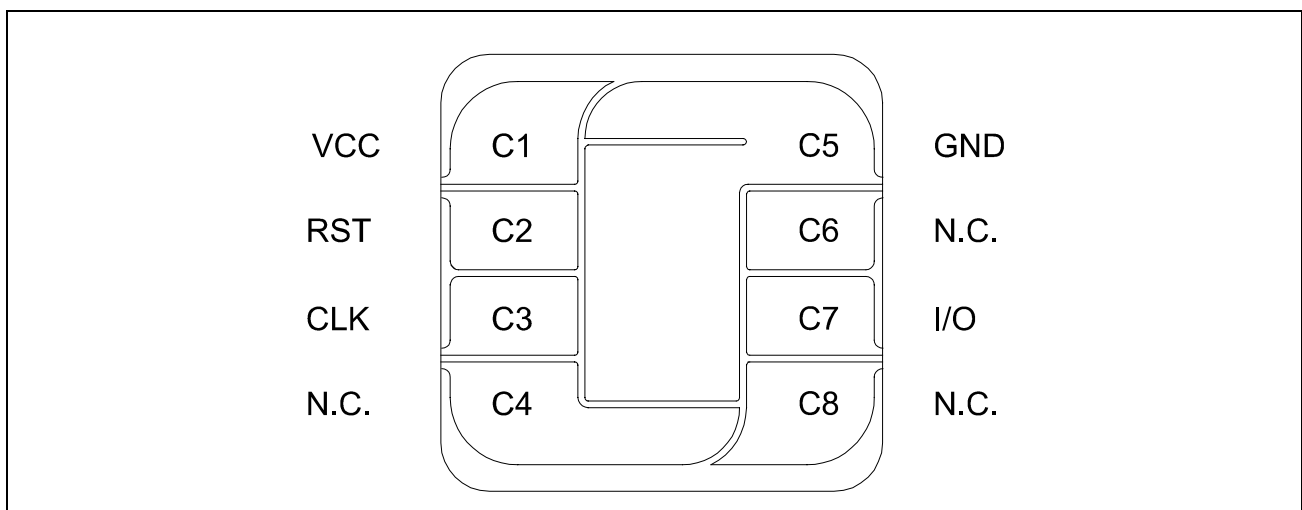
¹⁾ Extended frequency range up to 7.5 MHz is available, see ordering information.

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.

Ordering Information

| Type | Package ¹ | Voltage Range | Temperature Range | Frequency Range |
|-----------------------|----------------------|---------------|-------------------|-----------------|
| SLE 44C84S-M4 | M4 | 2.7 V - 5.5 V | – 25°C to + 70°C | 1 MHz - 5 MHz |
| SLE 44C84S -C | C | | | |
| SLE 44C84S -T85-M4 | M4 | 2.7 V - 5.5 V | – 25°C to + 85°C | 1 MHz - 5 MHz |
| SLE 44C84S -T85-C | C | | | |
| SLE 44C84S -V5-M4 | M4 | 4.5 V - 5.5 V | – 25°C to + 70°C | 1 MHz - 5 MHz |
| SLE 44C84S -V5-C | C | | | |
| SLE 44C84S -V5-T85-M4 | M4 | 4.5 V - 5.5 V | – 25°C to + 85°C | 1 MHz - 5 MHz |
| SLE 44C84S -V5-T85-C | C | | | |
| SLE 44C84S -V5-F7-M4 | M4 | 4.5 V - 5.5 V | – 25°C to + 70°C | 1 MHz - 7.5 MHz |
| SLE 44C84S -V5-F7-C | 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 | GND | Ground |
| C4;C6,C8 | N.C. | Not connected |
| C7 | I/O | Bi-directional data port |

General Description

SLE 44C84S 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 8 Kbytes EEPROM. To minimize the overall power consumption, the chip card controller IC offers a sleep mode.

SLE 44C84S 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 banking, loyalty, health care, access control and GSM applications.