



Chip Card & Security

SLE 4406SP

SLE 4406SPE

Intelligent 112-Bit EEPROM Counter
for > 20000 Units with Security Logic

Revision History: Current Version 2008-10-14

Previous Releases: 2005-06-29

| | |
|------|--|
| Page | Subjects (changes since last revision) |
|------|--|

| | |
|--|------------------|
| | Editorial update |
|--|------------------|

Important: Further information is confidential and on request. Please contact:
Infineon Technologies AG in Munich, Germany,
Chip Card & Security,
Fax +49 (0)89 234-955 9372
E-Mail: security.chipcard.ics@infineon.com

Published by Infineon Technologies AG, CCS Applications Group

D-81726 München

© Infineon Technologies AG 2008

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

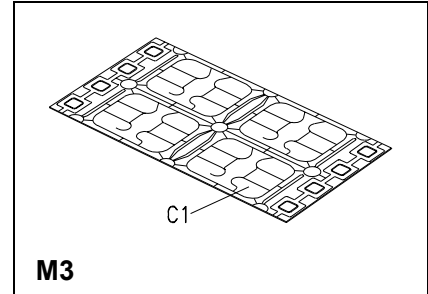
Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

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.

Intelligent 112–Bit EEPROM Counter for > 20000 Units with Security Logic

Features

- **100% functional compatibility to 4406S/06SE**
- **112 bit EEPROM and 16 bit ROM**
 - 104 bit user memory fully compatible with SLE 4406/06E
 - 64 bit Identification Area 1 consisting of
 - 16 bit Manufacturer code
 - SLE 4406SP:
 - 8 bit Manufacturer data, card issuer dependent
 - 40 bit for personalization data of card issuer
 - SLE 4406SPE:
 - 48 bit for personalization data of card issuer
 - 40 bit Counter Area including 1 bit for personalization (PROM/EEPROM)
 - 24 bit additional memory for advanced features configurable during personalization
 - either 24 bit Identification Area 2 for personalization data of card issuer
 - or 24 bit Data Area for free user access
- **Counter with up to 33352 count units**
 - Five stage abacus counter
 - Due to testing purposes a maximum of 21064 count units is guaranteed
- **Transport Code protection for delivery**
- **Contact configuration and Answer-to-Reset (synchronous transmission) in accordance to standard ISO/IEC 7816**
- **Sophisticated electrical characteristics**
 - Ambient temperature T_A –40 ... +80°C for chip
 - Supply voltage 5 V \pm 10 %
 - Supply current < 1 mA
 - EEPROM programming time 5 ms
 - ESD protection minimum 2,000 V, typical 4,000 V
 - Endurance minimum 100,000 write/erase cycles / bit¹⁾
 - Data retention for minimum of 30 years¹⁾
- **Advanced 1.2 μ m CMOS-technology optimised for security layout**
 - EEPROM-cells protected by shield
 - Secure wiring for all security relevant signals
 - Shielding of deeper layers via metal
 - Sensory and logical security functions
 - No isolation on backside necessary



¹⁾ Values are temperature dependent

Table 1 Ordering Information

| Type | Package ¹⁾ | Remark | Access of 3rd byte |
|------------------|-----------------------|---------------------|---|
| SLE 4406SP C | Die (on Wafer) | unsawn | Data of 3rd byte are programmed by Infineon exclusively |
| SLE 4406SP D | Die (on Wafer) | sawn | |
| SLE 4406SP M3 | T-M3.2-6 | | |
| SLE 4406SP MFC3 | S-MFC3.1-6-1 | FCoS™ ²⁾ | |
| SLE 4406SPE C | Die (on Wafer) | unsawn | Data of 3rd byte are programmed by the card manufacturer at personalisation |
| SLE 4406SPE D | Die (on Wafer) | sawn | |
| SLE 4406SPE M3 | T-M3.2-6 | | |
| SLE 4406SPE MFC3 | S-MFC3.1-6-1 | FCoS™ ²⁾ | |

Pin Description

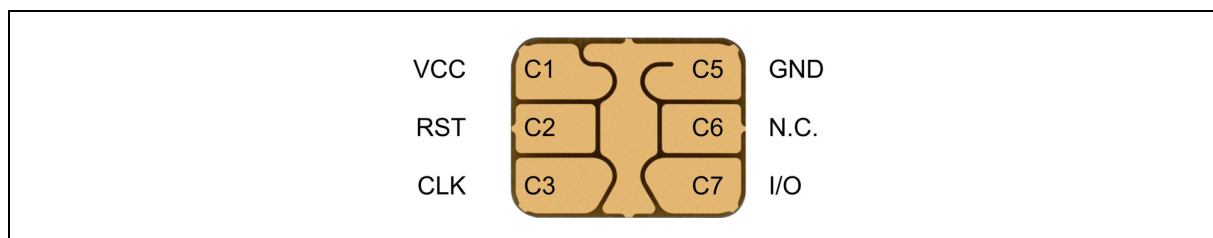


Figure 1 Pin Configuration Wire-bonded Module M3.2 (top view)

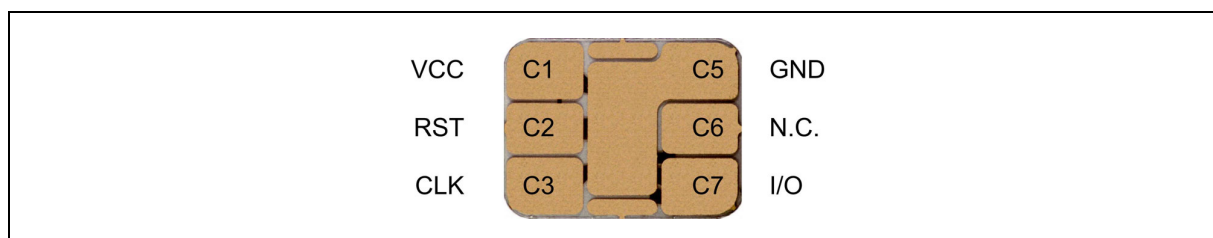


Figure 2 Pin Configuration Flip Chip Module MFC3.1 (top view)

¹⁾ Available as a Flip Chip Module (MFC3), wire-bonded module (M3) for embedding in plastic cards or as a die on unsawn (C) / sawn wafer (D) for customer packaging

²⁾ FCoS™ Flip Chip on Substrate

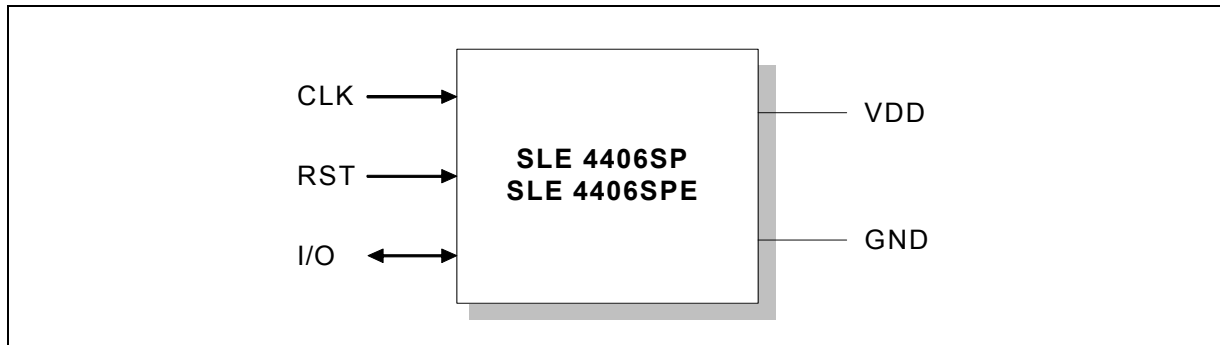


Figure 3 Pad Configuration Die

Table 2 Pin Definitions and Functions

| Card Contact | Symbol | Function |
|--------------|--------|---------------------------------------|
| C1 | VCC | Supply voltage |
| C2 | RST | Control input (Reset Signal) |
| C3 | CLK | Clock input |
| C5 | GND | Ground |
| C6 | N.C. | Not connected |
| C7 | I/O | Bi-directional data line (open drain) |

General Description

SLE 4406SP/06SPE is designed for applications in prepaid telephone cards. The chip consists of an EEPROM memory of 112 bit, a ROM of 16 bits and a control/security unit.

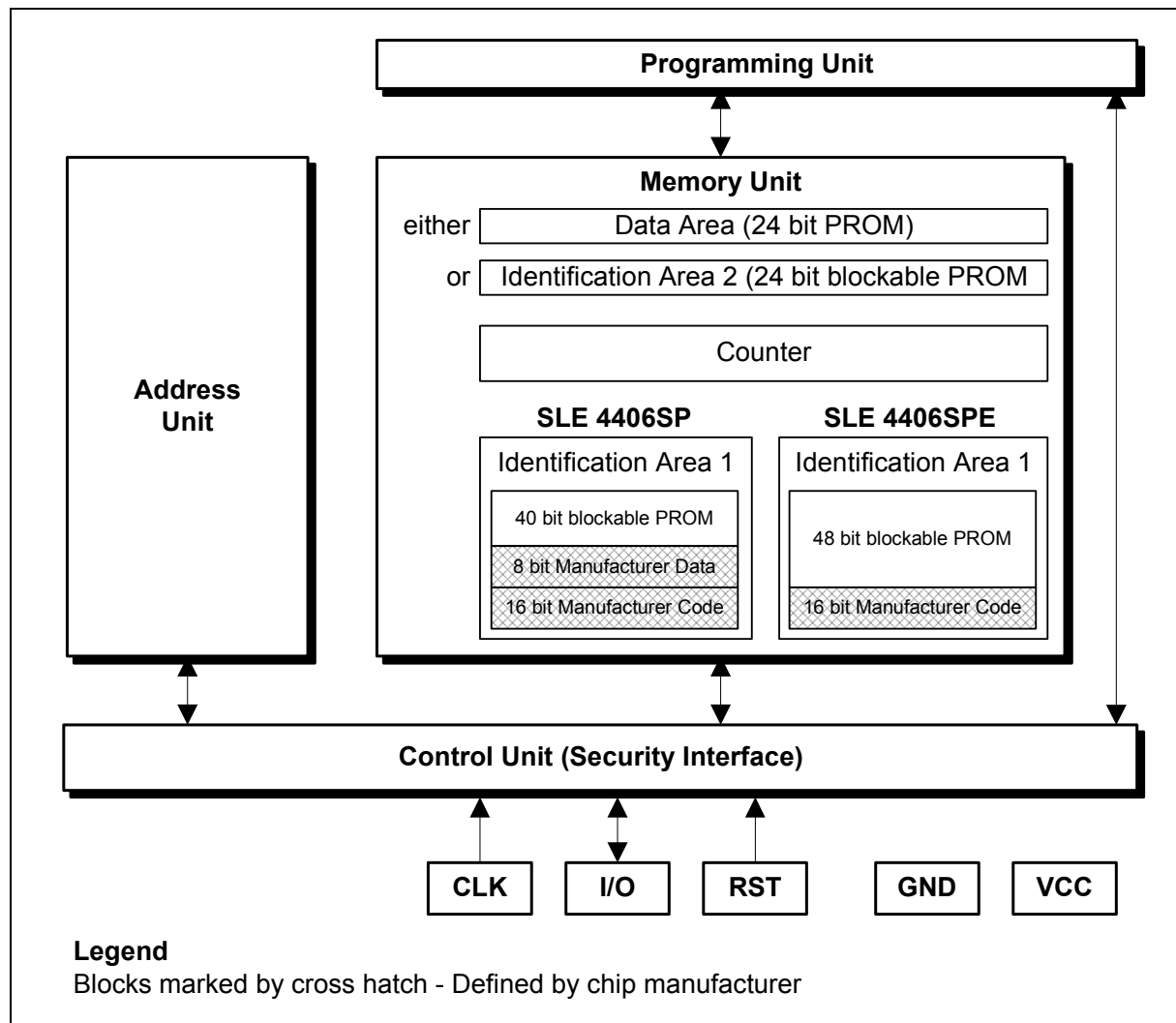


Figure 4 Block Diagram

- **Memory Unit**
Counter, Identification Data (e.g. serial number, expiry date) and Data Area.
- **Address Unit**
Setting of the address counter is synchronously with the CLK.
- **Programming Unit**
The programming voltage for the EEPROM/PROM is generated internally.
- **Security Interface**
Ensures a minimum and a maximum frequency and proper logical voltage levels.