Chip Card & Security

SLE 4406SP
SLE 4406SPE

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

Short Product Information   October 2008

SLE 4406SP/06SPE Short Product Information	Ref.: SPI_SLE4406SP_1008.doc
Revision History: **Current Version 2008-10-14**	
Previous Releases: 2005-06-29	
Page	Subjects (changes since last revision)
	Editorial update

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Published by Infineon Technologies AG, CCS Applications Group
D-81726 München
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Information

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

Features

M3

- **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 ± 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 / bit[1]
  – Data retention for minimum of 30 years[1]

- **Advanced 1.2 µm 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

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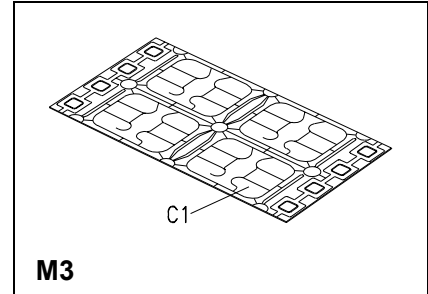
[1] Values are temperature dependent

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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

VCC   C1   C5   GND
RST   C2   C6   N.C.
CLK   C3   C7   I/O
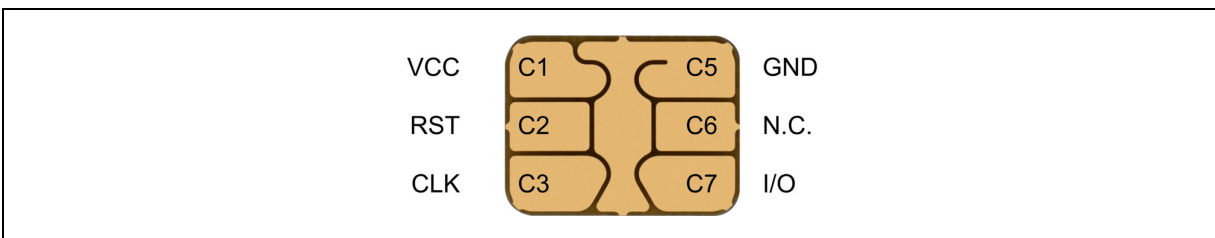
Figure 1   Pin Configuration Wire-bonded Module M3.2 (top view)

VCC   C1   C5   GND
RST   C2   C6   N.C.
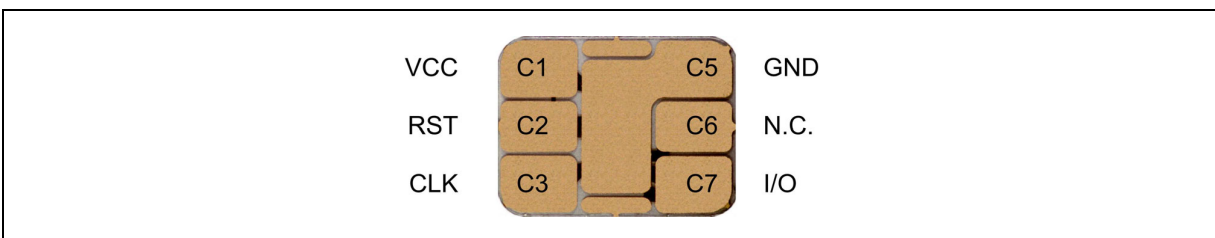CLK   C3   C7   I/O

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

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[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
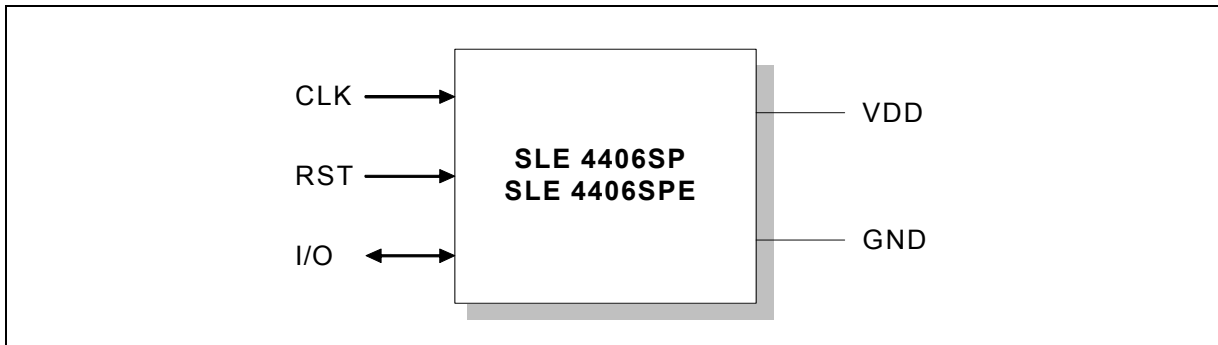[2]   FCoS™ Flip Chip on Substrate

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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.
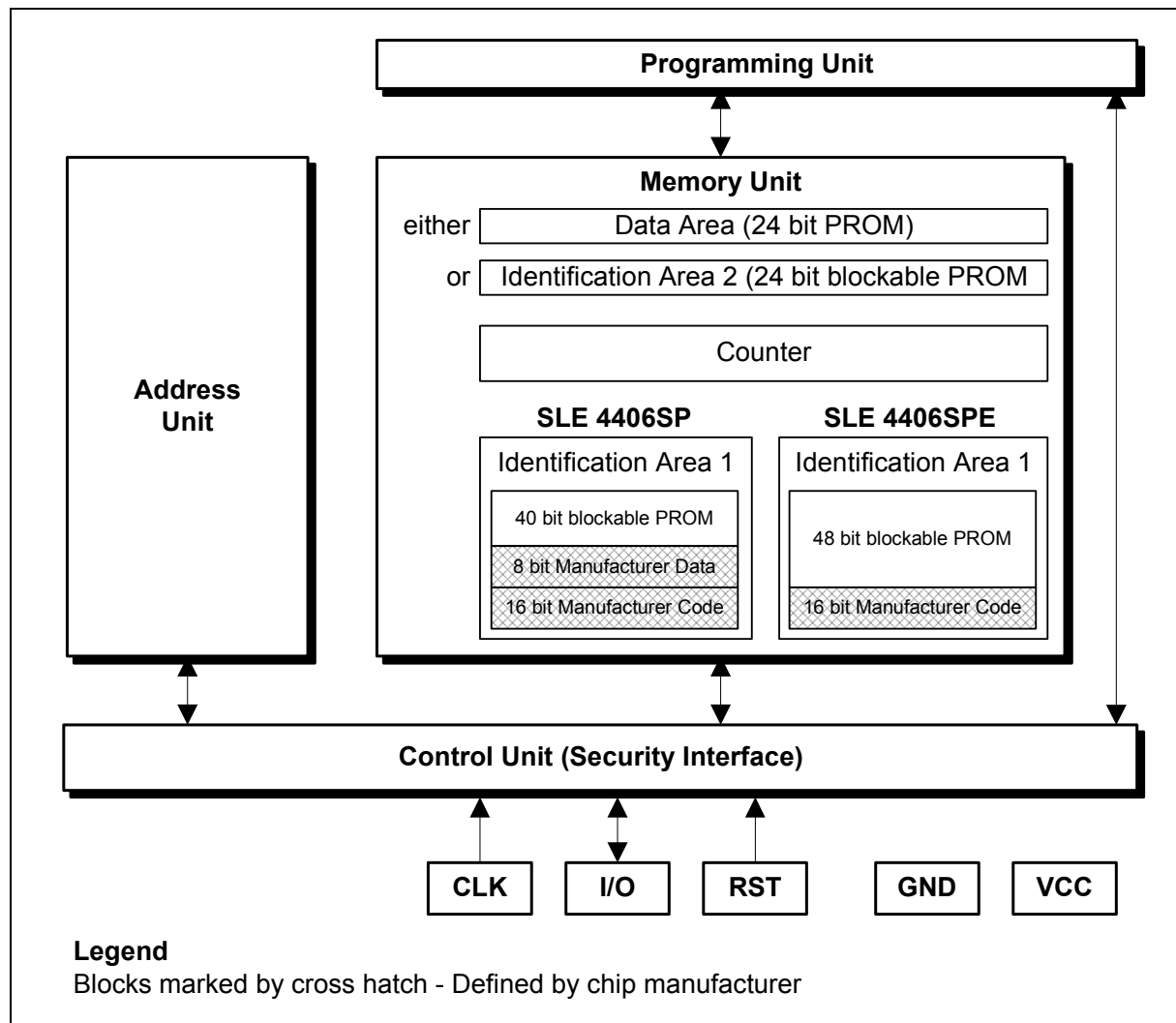

Figure 4   Block Diagram

- **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.