



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)
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	Editorial update
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Information

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Warnings

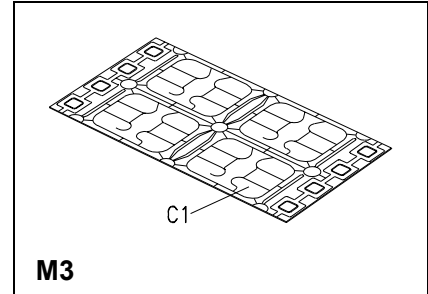
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Intelligent 112–Bit EEPROM Counter for > 20000 Units with Security Logic

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

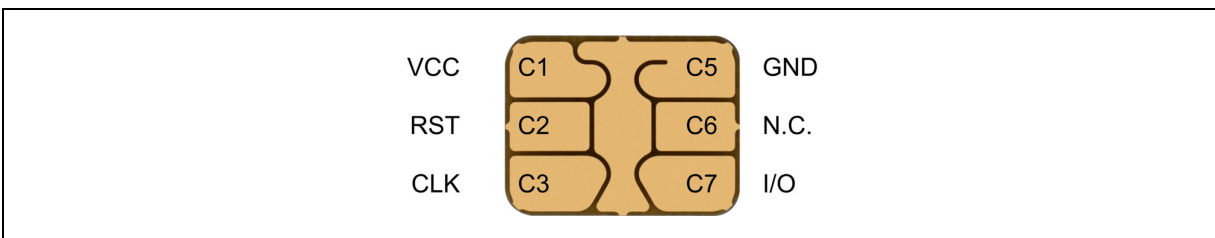


Figure 1 Pin Configuration Wire-bonded Module M3.2 (top view)

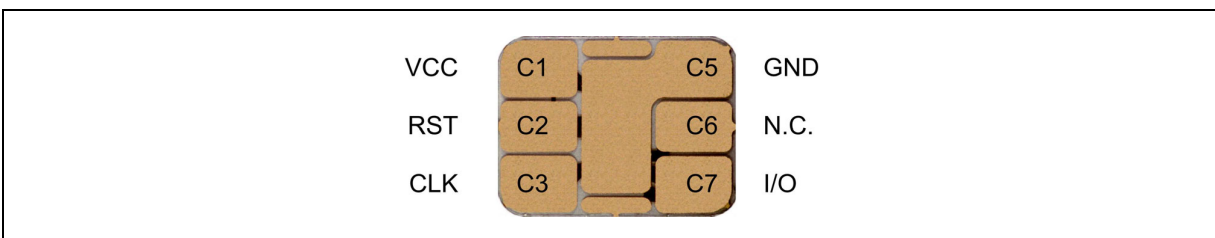


Figure 2 Pin Configuration Flip Chip Module MFC3.1 (top view)

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

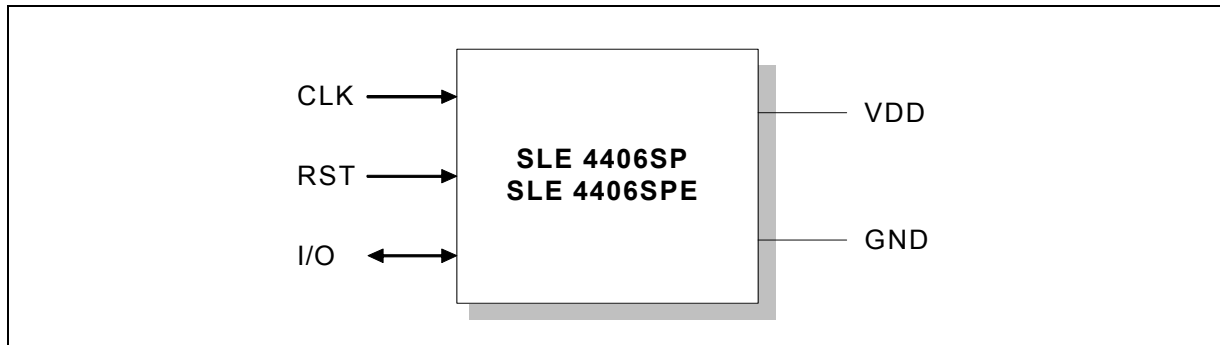


Figure 3 Pad Configuration Die

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.

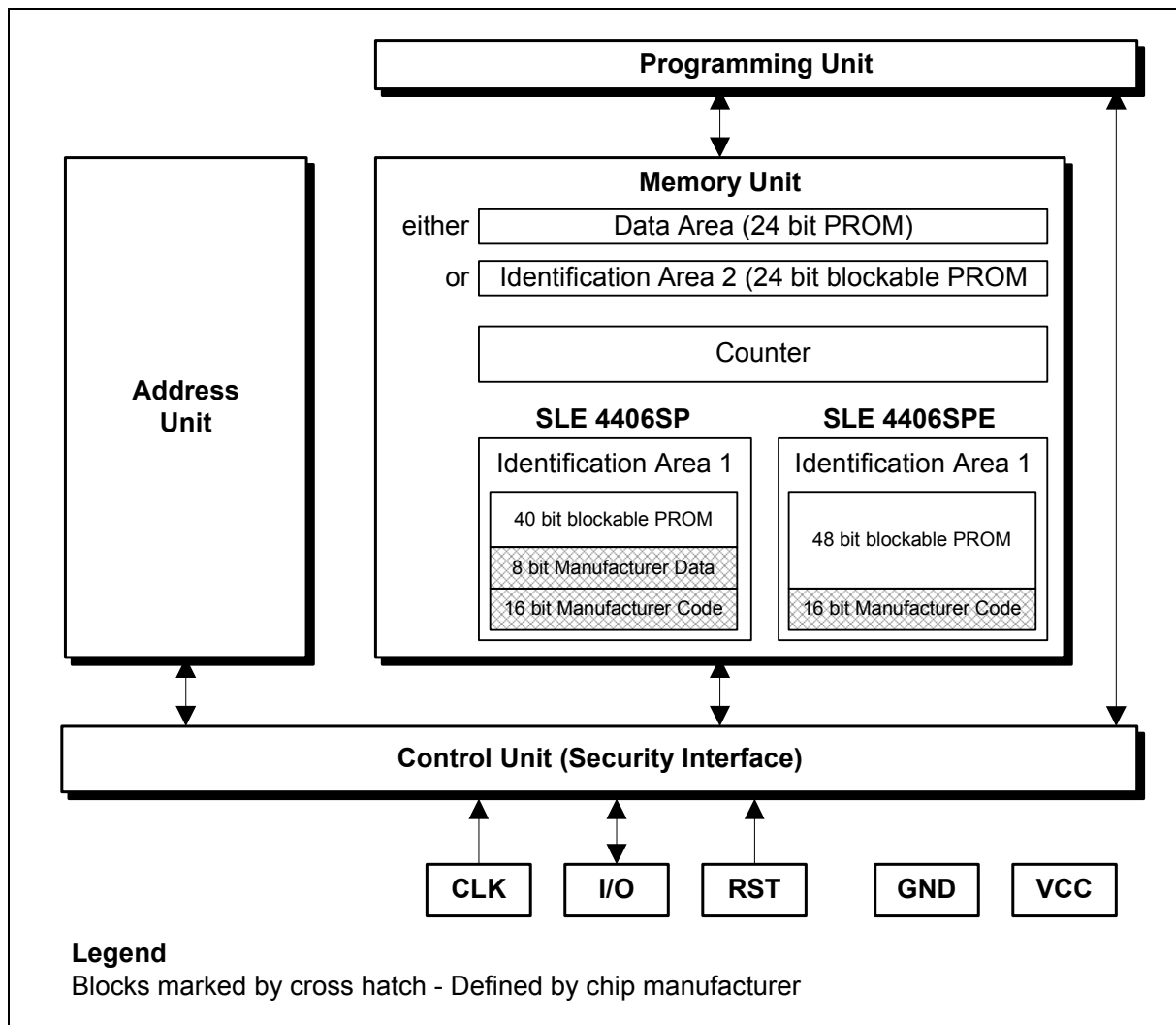


Figure 4 Block Diagram

- **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.