Chip Card & Security ICs

SLE 5528

Intelligent 1024 Byte EEPROM
with Write Protection and
Programmable Security Code

Short Product Information

May 2007

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Revision History:	**Current Version 2007-05-02**
Previous Releases:	2006-11-24
Page	Subjects (changes since last revision)
	Preliminary removed, editorial updates

Important: Further information is confidential and on request. Please contact:
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To our valued customers

We constantly strive to improve the quality of all our products and documentation. We have spent an exceptional amount of time to ensure that this document is correct. However, we realise that we may have missed a few things. If you find any information that is missing or appears in error, please use the contact section above to inform us. We appreciate your assistance in making this a better document.

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

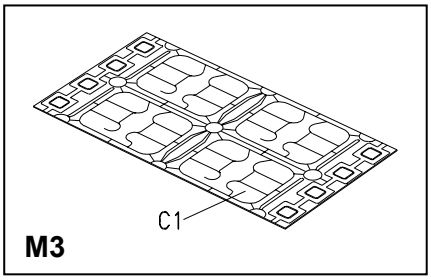
For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office in Germany or our Infineon Technologies Representatives world-wide (see address list).

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 1024 Byte EEPROM with Write Protection and Programmable Security Code (PSC)



M3

Features

- **100% functional compatibility to SLE 4428**
- **1024 x 8 bit EEPROM organization of Data Memory**
- **1024 x 1 bit Protection Memory**
  - Byte-wise write protection of Data Memory (one time programmable)
  - Not alterable Manufacturer Code (chip coding and unique coding by application identifier RID according to ISO/IEC 7816-5)
- **Data Memory alterable only after verification of 2 Byte PSC**
- **PSC verification trials limited by Error Counter**
- **Serial synchronous three-wire link protocol according to ISO/IEC 7816**
  - Byte-wise addressing
  - End of processing indicated at data output
- **Contact configuration and Answer-to-Reset (synchronous transmission) in accordance to standard ISO/IEC 7816**
- **Electrical characteristics**
  - Ambient temperature range -40 … +100°C for chip, -25 … +80°C for module
  - Supply voltage 5V ± 10%
  - Supply current < 1 mA
  - EEPROM erase / write time 5 ms / 5 ms
  - ESD protection typically 4,000 V
  - EEPROM Endurance minimum 100,000 erase / write cycles[1)]
  - Data retention for minimum of 10 years[1)]

- **Advanced CMOS-technology optimized for security layout**
  - EEPROM-cells protected by shield
  - Shielding of deeper layers via metal
  - Sensory- and logical security functions
  - No insulation of backside necessary

[1)] Values are temperature dependent.

1 Ordering and Packaging information

Table 1 Ordering Information

Type	Package[1)]	Remark	Ordering Code
SLE 5528 C	Die (on Wafer)	not sawn	on request
SLE 5528 D	Die (on Wafer)	Sawn	on request
SLE 5528 M3	T-M3.2-6		on request
SLE 5528 MFC3	S-MFC3.1-6-1	FCoS™	on request

Pin Description

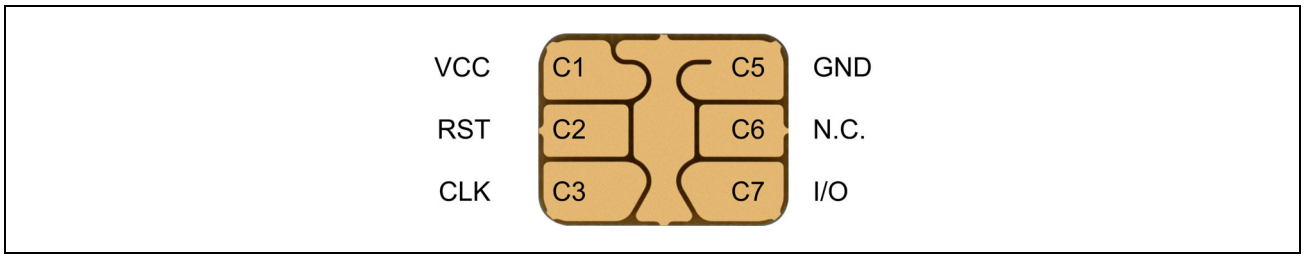


Figure 1 Pin Configuration Wire-bonded Module M3.2 (top view)

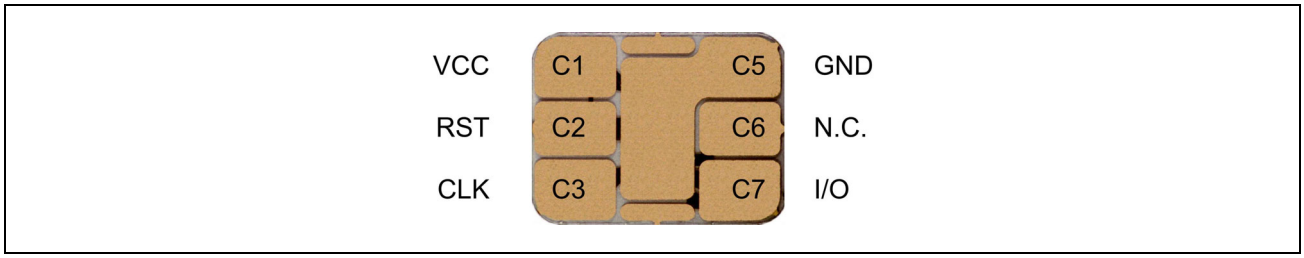


Figure 2 Pin Configuration Module Flip Chip MFC3.1 (top view)

[1)] Available as a Module Flip Chip (MFC3), wire-bonded module (M2 and M3) for embedding in plastic cards or as a die on non-sawn (C) / sawn wafer (D) for customer packaging

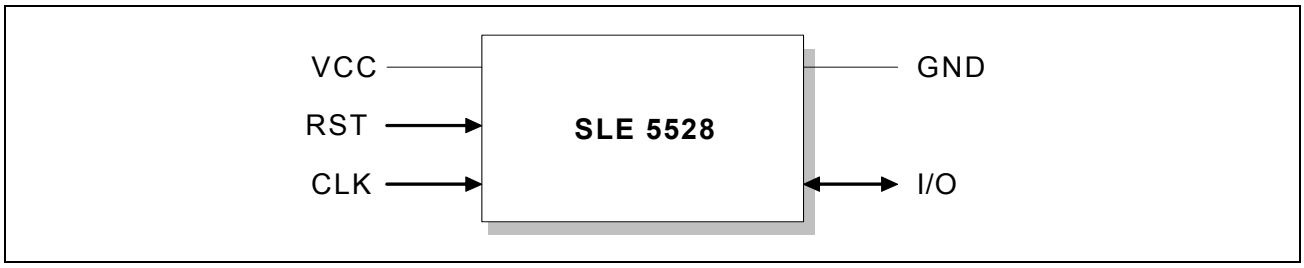


Figure 1 Pad Configuration Die

Table 2 Pin Definitions and Functions M3 / MFC3

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

2 Circuit Description

Memory Organization
The memory is organized in a **Data Memory** of 1024 byte.

Write Protection of Data Memory
Write Protection Bits: Each byte of the Data Memory can be irreversibly protected against data change by writing the corresponding bit in the **Write Protection Memory**. Dependent on the state of the protection bit the Data Memory is read only (ROM) or may be erased and written again (EEPROM). The manufacturer code (Application ID and Chip Coding) is programmed unalterable by the chip manufacturer.

Programmable Security Code
Altering data in the Data Memory as well as setting a Write Protection Bit is only possible after verification of the 2-Byte **Programmable Security Code (PSC)**.

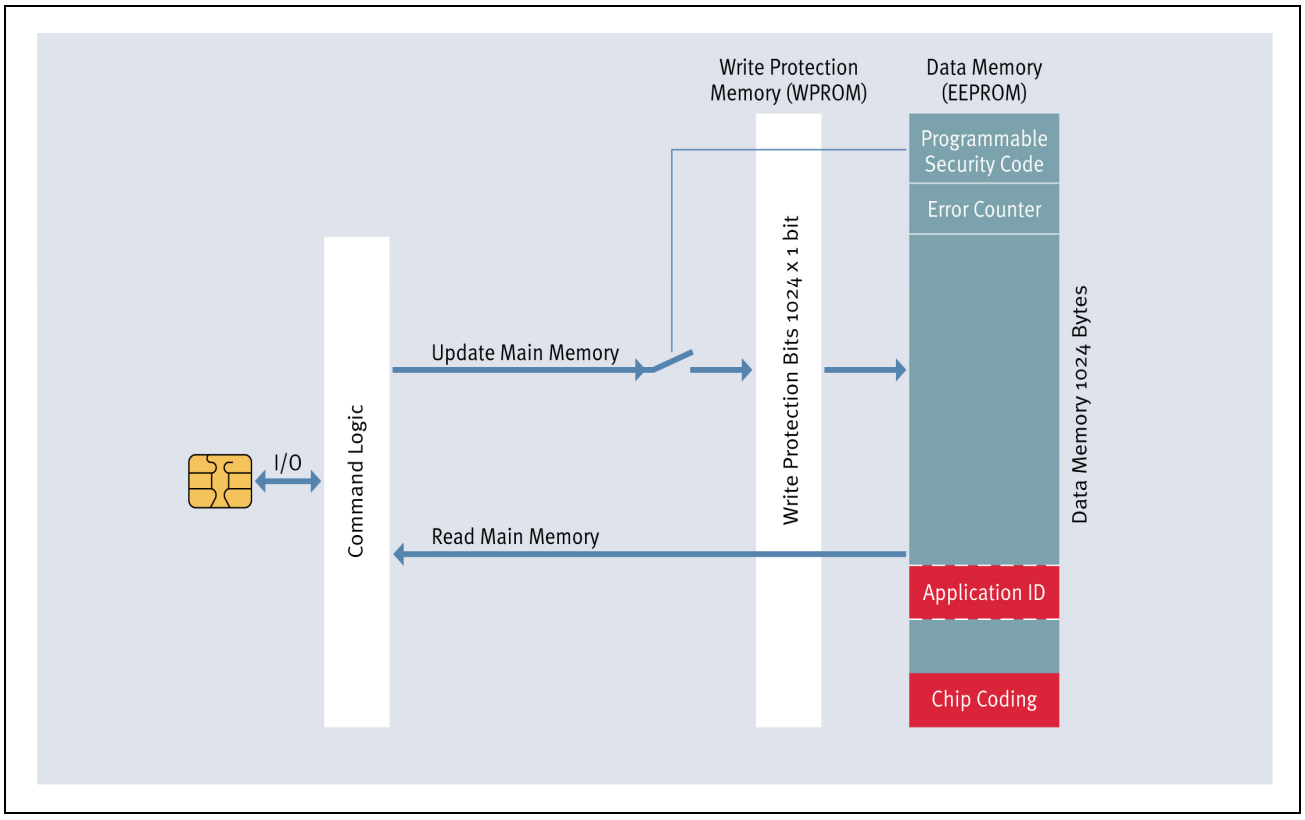


Figure 2 Memory Configuration SLE 5528