



Chip Card & Security ICs

my-d<sup>®</sup> vicinity

SRF 55V02P HC

Intelligent 2.5 Kbit EEPROM  
with Contactless Interface compliant to ISO/IEC 15693  
and ISO/IEC 18000-3 mode 1

Plain Mode Operation

**Revision History: Current Version 2007-07-02**

Previous Releases:

Page	Subjects (changes since last revision)

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**To our valued customers**

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## Intelligent 2.5 Kbit EEPROM with Contactless Interface (ISO/IEC 15693 and ISO/IEC 18000-3 mode 1)

### Features

#### Contactless Interface

- Physical Interface and Anticollision compliant to ISO/IEC 15693 and ISO/IEC 18000-3 mode 1
  - contactless transmission of data and supply energy
  - carrier frequency: 13.56 MHz
  - data rate up to 26 kbit/s
  - anticollision with identification of up to 30 tags/sec
  - read / write distance up to 150 cm depending on reader antenna configuration

#### 2.5 Kbit EEPROM

- ISO mode – block organization of memory
  - up to 56 blocks of user memory (block size 4 bytes)
- Custom mode – page organization of memory
  - up to 32 pages of user memory (page size 8 bytes)
- Unique chip identification number (UID)
- EEPROM programming time per block/page < 4 ms
- EEPROM endurance > 100,000 erase/write cycles<sup>1)</sup>
- Data retention > 10 years<sup>1)</sup>

#### Value Counters: up to 65536 (value range from 0 to 2<sup>16</sup>-1)

- each page in the User Area is configurable as a Value Counter
- support of Anti-Tearing

#### Electrical characteristics

- High on-chip capacitance (97pF ±5%) allowing a small tag antenna design
- ESD protection minimum 2 kV
- Ambient temperature –25 ... +70°C (for the chip)

<sup>1)</sup> Values are temperature dependent

## Development Tool

- my-d<sup>®</sup> Evaluation Kit including my-d<sup>®</sup> Manager Software

## 1 Ordering and Packaging information

**Table 1: Ordering Information**

Type	Package <sup>1)</sup>	Memory		Pages	Ordering Code
		User	Admin.		
SRF 55V02P HC C	Wafer	256 bytes	64 bytes	32	SP000245648
SRF 55V02P HC NB	Sawn wafer				SP000245649

For more ordering information please contact your local Infineon sales office.



**Figure 1: Pad Configuration Die**

**Table 2 Pin Definitions and Functions**

Symbol	Function
L <sub>A</sub>	Antenna connection
L <sub>B</sub>	Antenna connection

<sup>1)</sup> Available as a Module Flip Chip Contactless (MFCC1), Module Contactless Card (MCC) for embedding in plastic cards, as NiAu-bump version (NB) or as a die on sawn / unsawn wafer for customer packaging

## 2 my-d<sup>®</sup> product family

The my-d<sup>®</sup> products are designed to meet increased demands for security and design flexibility. The family of contactless memory my-d<sup>®</sup> supplies the user with different memory sizes and incorporates security features to enable considerable flexibility in the application design.

The functional architecture, meaning the memory organisation and authentication of my-d<sup>®</sup> products is the same for both, my-d<sup>®</sup> proximity (ISO/IEC 14443) and my-d<sup>®</sup> vicinity (ISO/IEC 18000-3 mode 1 or ISO/IEC 15693). This eases the system design and allows simple adaptation between applications.

All my-d<sup>®</sup> products are available in plain mode with open memory access and in secure mode with memory access controlled by authentication procedures.

Flexible controls within the my-d ICs start with plain mode operation and individual page locking for more complex applications various settings in secure mode can be set for multi user / multi application configurations.

In secure mode a cryptographic algorithm based on 64-bit key is available. Mutual authentication, message authentication codes (MAC) and customized access conditions protect the memory against unauthorized access. Configurable value counters featuring anti-tearing functionality are suitable for value token applications, such as limited use transportation tickets.

Architectural interoperability of all my-d<sup>®</sup> products enables an easy migration from simple to more demanding applications.

In addition, the my-d<sup>®</sup> light (ISO/IEC 18000-3 mode 1 or ISO/IEC 15693) is part of the my-d<sup>®</sup> family. Its optimized command set and memory expands the range of applications to cost sensitive segments.

### 3 SRF 55V02P HC my-d<sup>®</sup> vicinity plain

All my-d<sup>®</sup> vicinity products comply with ISO/IEC 18000-3 mode 1 or ISO/IEC 15693 standards for contactless vicinity smart cards. The power supply and data are transferred to the my-d<sup>®</sup> products via an antenna. The my-d<sup>®</sup> vicinity is designed to communicate within the operating distance of up to 1.5m depending on appropriate reader antenna configurations.

#### 3.1 Circuit Description

The my-d<sup>®</sup> vicinity is made up of an EEPROM memory unit, an analog interface for contactless energy and data transmission and a control unit.

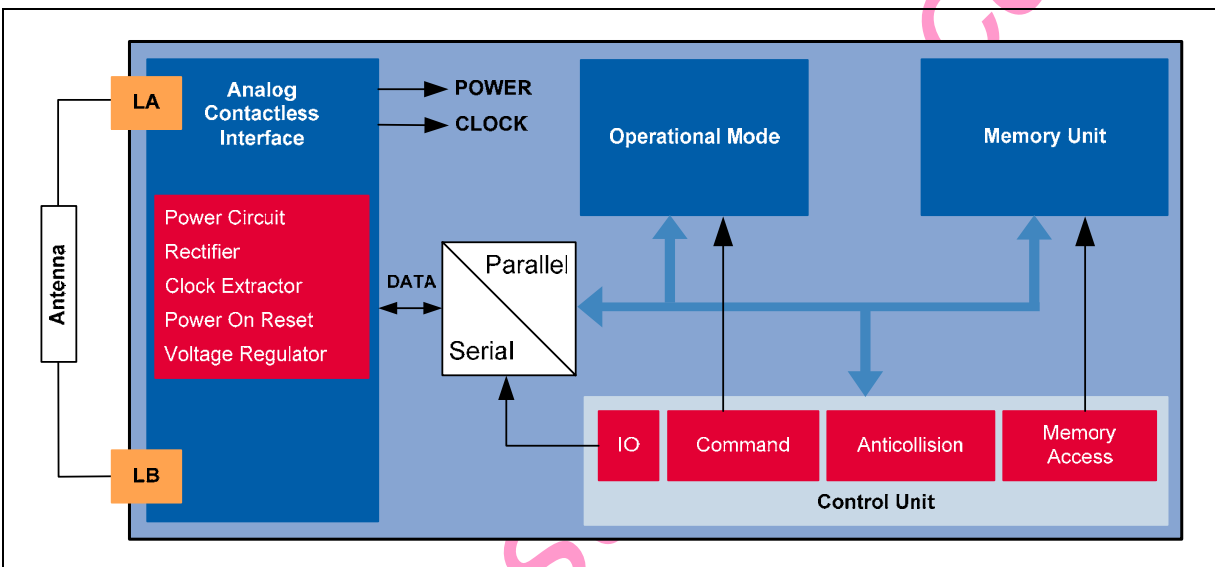


Figure 2: Block diagram of the my-d<sup>®</sup> vicinity plain

- Analog Contactless Interface:**  
 The Analog Contactless Interface comprises the voltage rectifier, voltage regulator and system clock to supply the IC with appropriate power. Additionally the data stream is modulated and demodulated.
- Operational mode**  
 The access to the memory depends on the actual mode of the my-d<sup>®</sup> vicinity. The memory is accessed according to plain or secure mode after the VICC is selected.
- Memory Unit**  
 The Memory Unit consists of 320 bytes organised in 32 pages each of 8 user and 2 administration bytes.
- Control Unit**  
 The Control Unit decodes and executes all commands. Additionally the control unit is responsible for the correct anticollision flow.

### 3.2 Memory Principle

The User Memory is built up with up to 56 blocks of 4 bytes each. Individual block locking allows the user to protect the stored data.

The service area contains the UID and manufacturer data. The service area cannot be changed.

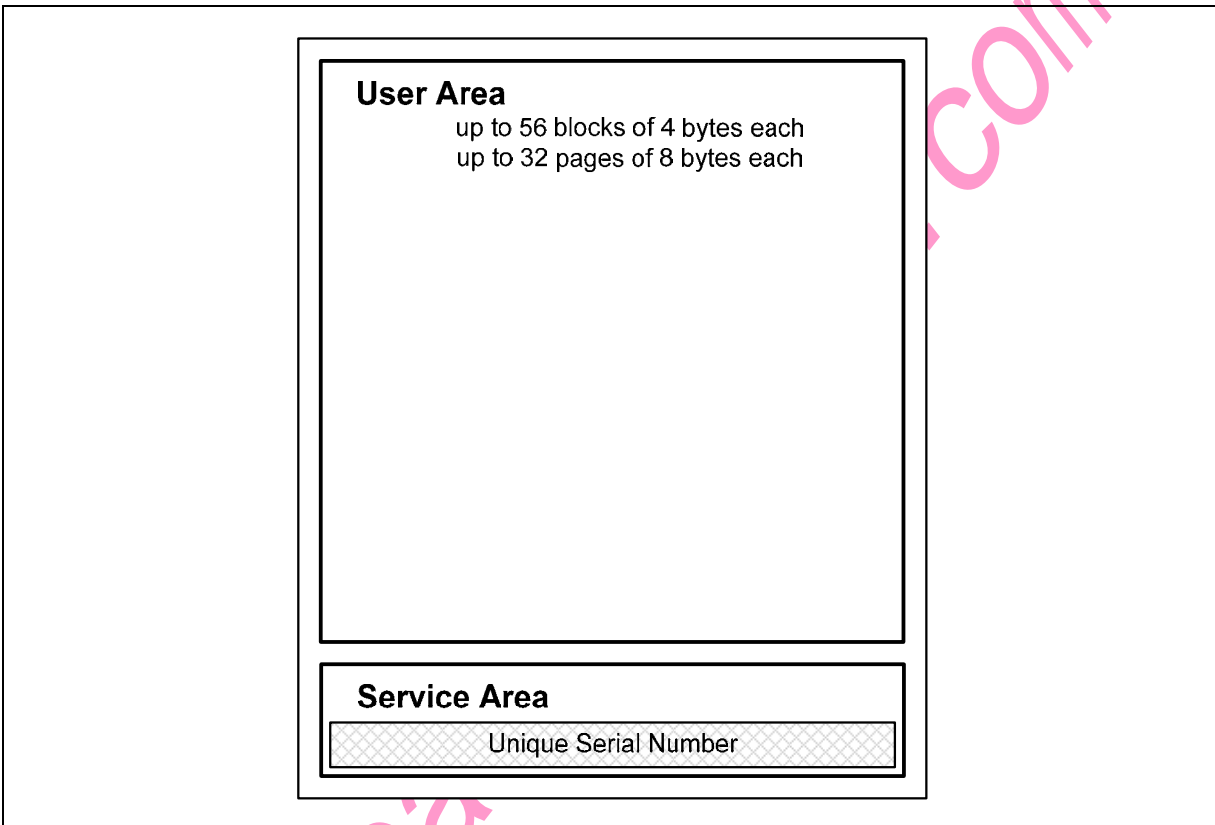


Figure 3: Memory principle of my-d<sup>®</sup> SRF 55V02P HC

### 3.3 System Overview

The system consists of a contactless label and a contactless reader together with an antenna. The transponder is powered by the high frequency field generated by the VCD (Vicinity Coupling Device).

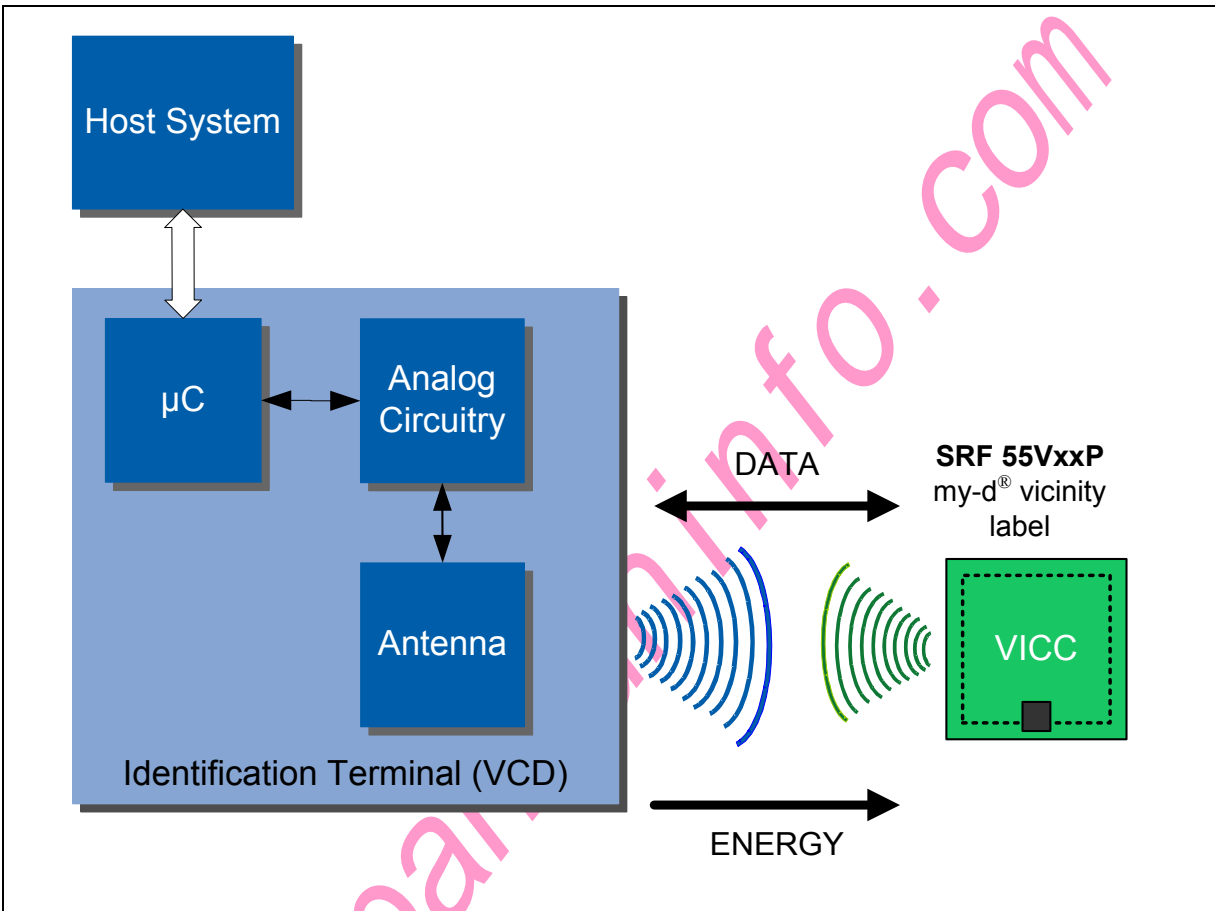


Figure 4: Contactless System Example my-d<sup>®</sup> vicinity plain

- VICC – Vicinity Card according to ISO/IEC 18000-3 mode 1 or ISO/IEC 15693

#### Contactless Energy and Data Transfer

The read / write distance is up to 1.5 m depending on an appropriate reader antenna configuration. The label antenna consists of a simple coil with few turns. Contactless labels are passive. The RF communication interface exchanges data with data rates of up to 26 kbit/s.

An intelligent anticollision function enables operation of more than one label in the field simultaneously. The anticollision algorithm selects each label individually and ensures that the execution of a transaction with a selected label is performed correctly without data corruption resulting from other labels.