

# MF1ICS20 (Mifare Mini)

## Functional specification

### 1. General description

NXP has developed the MIFARE MF1ICS20 to be used in a contactless smart card according to ISO/IEC 14443 Type A.

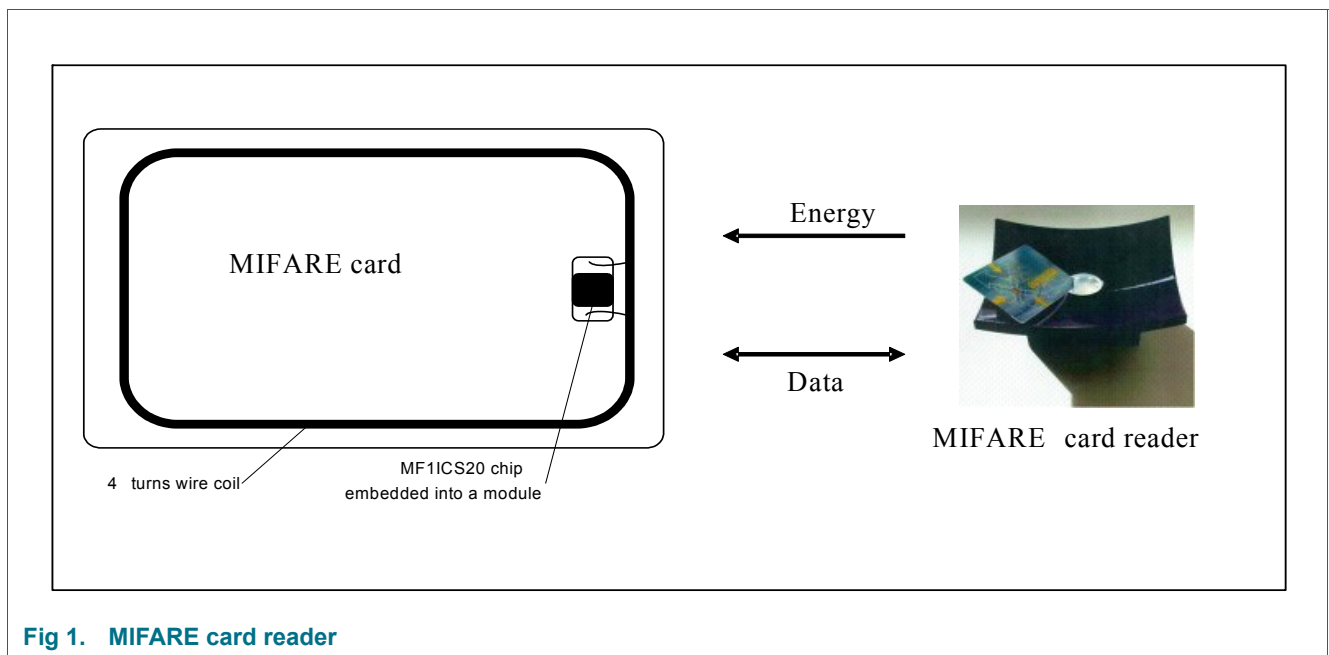
The MIFARE MF1ICS20 IC is used in applications like public transport ticketing where major cities have adopted MIFARE as their e-ticketing solution of choice.

#### 1.1 Key applications

- Public transportation
- Access control
- Event ticketing
- Gaming & identity

#### 1.2 Anticollision

An intelligent anticollision function allows to operate more than one card in the field simultaneously. The anticollision algorithm selects each card individually and ensures that the execution of a transaction with a selected card is performed correctly without data corruption resulting from other cards in the field.



### 1.3 Simple integration and user convenience

The MF1ICS20 is designed for simple integration and user convenience. Which could allow complete ticketing transactions to be handled in less than 100 ms. Thus, the MF1ICS20 card user is not forced to stop at the reader leading to a high throughput at gates and reduced boarding times onto busses. The MIFARE card may also remain in the wallet during the transaction, even if there are coins in it.

### 1.4 Security

Several security measures like mutual challenge and response authentication, data ciphering and message authentication checks support the protection of the system against various attack scenarios. The UID of the IC as a base of key diversification supports the security concept.

### 1.5 Delivery options

- Die on wafer
- Bumped die on wafer
- MOA4 or MOA2 contactless card module
- Flip chip package

## 2. Features

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### 2.1 MIFARE, RF Interface (ISO/IEC 14443 A)

- Contactless transmission of data and supply energy (no battery needed)
- Operating distance: Up to 100mm (depending on antenna geometry)
- Operating frequency: 13.56 MHz
- Data transfer: 106 kbit/s
- Data integrity: 16 Bit CRC, parity, bit coding, bit counting
- Anticollision
- Typical ticketing transaction: < 50 ms (including backup management)

### 2.2 EEPROM

- 320 Byte, organized in 5 sectors with 4 blocks of 16 bytes each (one block consists of 16 byte)
- User definable access conditions for each memory block
- Data retention of 10 years.
- Write endurance 100.000 cycles

### 2.3 Security

- Mutual three pass authentication (ISO/IEC DIS 9798-2)
- Individual set of two keys per sector (per application) to support multi-application with key hierarchy
- Unique serial number for each device