



NXP's well established IC solution for fast and easy development of contactless smart card systems

# MIFARE Classic EV1

The MIFARE Classic family is the most widely used contactless smart card ICs operating in the 13.56 MHz frequency range with read/write capability and ISO/IEC 14443 A compliance.

Smart cards based on MIFARE Classic ICs are a commonly known solution in various applications such as transport, access management and many more. NXP Semiconductors offers support and local services covering the whole MIFARE portfolio valued by customers across the globe and value chain.

Improved ESD robustness of MIFARE Classic EV1 allows further increase of inlay and card lamination production yield.

Additional Originality Signature feature enables to quickly prove card genuineness.

MIFARE Classic EV1 is available with the future proof 7-byte unique identifier (7B UID) and 4-byte non unique identifiers (4B NUID).

## Key features

- ▶ Fully ISO/IEC 14443 Type A 1-3 compliant
- ▶ Available with ISO/IEC 14443-3 7-byte unique identifier
- ▶ 7-byte UID or 4-byte NUID
- ▶ 1- or 4-kByte EEPROM
- ▶ Simple fix memory structure
- ▶ Memory access conditions freely programmable
- ▶ 2 x 48 bit keys per sector for key hierarchy
- ▶ Personalization options (7B UID version only), supporting flexibility within 4-byte- and 7-byte infrastructure, e.g. ISO shortcut, UID mapping and random ID
- ▶ NXP originality signature to prove MIFARE Classic genuineness

## Features / benefits for card and reader makers

- ▶ Broad product portfolio providing an optimized price-performance ratio
- ▶ Low cost investment for tools, increasing ROI and speeding up market trials
- ▶ Multiple suppliers in the value chain reducing risk within supply chain management
- ▶ Fast time-to-market

## Features / benefits for solution developers

- ▶ Read range up to 10 cm increasing the convenience of touch-and-go experience
- ▶ Many companies with commercial products, enabling a broad and competitive supply chain
- ▶ Based on the international standard ISO/IEC 14443 A, ensuring a broad marketplace of solution developers and providers
- ▶ Card and reader compatibility across all generations leads to reduced infrastructure costs
- ▶ Easy-to-use and proven toolkits for fast project execution

## Key applications

- ▶ Public Transportation
- ▶ Electronic Toll Collection
- ▶ Loyalty Cards
- ▶ Event Ticketing
- ▶ Car Parking



## Features / benefits for service providers

- ▶ Statistical data collection for better sales and marketing intelligence or to optimize the system
- ▶ Reduced distribution costs and sales expenses
- ▶ Absence of contact between card and reader leads to superior durability
- ▶ Easy maintenance of the components, reducing costs
- ▶ Reduced cash handling leads to effective fraud prevention
- ▶ Over 20 years of industry experience and application support along the supply chain
- ▶ More than 1000 card- and reader manufacturers as well as solution developers available and registered at MIFARE.net

## MIFARE pedigree

MIFARE is NXP's well-known brand for a wide range of contactless IC products used in more than 40 different applications worldwide. With more than 1 50 million reader core components and 5 billion smart card ICs sold, MIFARE products are proven and reliable more than any other interface technology in the market.

MIFARE products comply with the international standard ISO/IEC 14443 and are backwards compatible within the product families. This ensures that the existing infrastructure can be smoothly upgraded to higher security and feature levels such as payment systems, ticketing solutions, loyalty programs, access management and parking. To further extend the reach of MIFARE products, the MIFARE4Mobile Industry Group brings MIFARE applications into NFC enabled mobile devices.

| Product features                 | MIFARE Classic EV1 1k                             | MIFARE Classic EV1 4k                                |
|----------------------------------|---|--|
| <b>Memory</b>                    |   |  |
| EEPROM Size [byte]               | 1 K   | 4 K  |
| Write Endurance [typical cycles] | 200 000   |  |
| Data Retention [years]           | 10  |  |
| Organization                     | 16 sectors with 4 blocks                          | 32 sectors with 4 blocks<br>8 sectors with 16 blocks |
| <b>RF Interface</b>              |   |  |
| According to ISO 14443A          | Yes - up to layer 3                               |  |
| Frequency [MHz]                  | 13.56   |  |
| Bit-rate [kbit /s]               | 106   |  |
| Anticollision                    | Bit-wise  |  |
| <b>Security</b>                  |   |  |
| Unique Serial Number [byte]      | 4-byte NUID or 7-byte UID                         |  |
| 4-byte Random ID                 | yes (7 B UID versions only)                       |  |
| Random Number Generator          | Yes   |  |
| Access Keys                      | 2 CRYPTO1 keys per sector                         |  |
| Access Conditions                | Per sector  |  |
| Cryptography                     | CRYPTO1   |  |
| <b>Packaging</b>                 |   |  |
| Sawn Wafer - Au Bumps            |   |  |
| 7-byte UID                       | (120 µ) MF1S5001XDUD/V1<br>(75 µ) MF1S5001XDUF/V1 | (120 µ) MF1S7001XDUD/V1<br>(75 µ) MF1S7001XDUF/V1    |
| 4-byte NUID                      | (120 µ) MF1S5031XDUD/V1<br>(75 µ) MF1S5031XDUF/V1 | (120 µ) MF1S7031XDUD/V1<br>(75 µ) MF1S7031XDUF/V1    |
| <b>MOA4 Module</b>               |   |  |
| 7-byte UID                       | MF1S5000XDA4/V1                                   | MF1S7000XDA4/V1                                      |
| 4-byte NUID                      | MF1S5030XDA4/V1                                   | MF1S7030XDA4/V1                                      |
| <b>MOA8 Module</b>               |   |  |
| 7-byte UID                       | MF1S5000XDA8/V1                                   | MF1S7000XDA8/V1                                      |
| 4-byte NUID                      | MF1S5030XDA8/V1                                   | MF1S7030XDA8/V1                                      |



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