



PAYMENT

**MIFARE**



**Contactless smart cards are becoming more important in mass transit programs and have rapidly gained favour with financial payment card issuers and associations. Such cards provide an efficient and convenient substitute for cash, reducing transaction time, increasing security, minimizing fraud, and reducing handling costs for transit operators.**

Due to contactless payment the average transaction time is reduced significantly when compared with cash. Thus, transit-payments can be made quickly with less standing and waiting in line, particularly at rush hour. Contactless fare payment implementations also lower operating costs, due to increased reader reliability and longer card lives. Consequently, established partnerships between transit and financial industries in order to offer a new, common payment mechanism for transit customers can leverage the investment in the smart card infrastructure to create competitive advantage for all parties. Thus, contactless smart cards are an excellent solution for convergent transit-payment applications.

Morpho's transport products of MIFARE are multi-application pure contactless, hybrid and dual interface cards that support both transit and retail payments and therefore allow secure and convenient ticket purchase while simplifying the experience for passengers.

### SIMPLIFYING THE EXPERIENCE OF PASSENGERS

While it has been possible to purchase train tickets online for some time, most tickets for public transportation including underground and metro vehicles, buses, trams and commuter trains, are still bought at the station where long queues can be a problem, particularly at peak travel times. Morpho's innovative Mifare technology has the potential to remove all the inconvenience and hassle of buying a train ticket. By providing successfully its contactless, hybrid and dual interface smart cards for different transit payment programs in France, Italy, Austria and UK, Morpho could already give proof of it.

### MORPHO – A COMPETENT PARTNER

Since 2010, Morpho has contracted a Joint Venture with a French partner in India for manufacturing high volumes of inlays for contactless transport and ticketing solutions worldwide and therefore, gives proof of its involvement into the global transport market.

### MORPHO'S TRANSPORT MIFARE APPLICATION SOLUTIONS

MIFARE is a proven and reliable technology, which represents the largest installed base worldwide and opens up more use cases in multi-application scenarios. Compliant with the international standard ISO/IEC 14443 Type A, MIFARE ensures that today's infrastructure can easily be upgraded. It enables service providers to expand their transportation networks and to integrate additional services such as payment systems (for e.g. taxi fares, cinema and theatre tickets), loyalty programs, access management and parking – all while reducing the total costs of operations.

Morpho's MIFARE products are based on the leading technology platform for contactless ticket, card and reader solutions. With more than 40 million reader core components, 3.5 billion smartcard ICs sold.

All MIFARE Classic and DESFire products can be produced with PVC or PET card bodies based on Morpho's innovative and tailor made card body technology which enhances the overall customer experience and relationship with the card holder.

Morpho's MIFARE product family offers transit operators, banks and business partners the combination of convenience, security and cost-efficiency for low-value contactless ticketing transactions.



### KEY APPLICATIONS OF MORPHO'S MIFARE PRODUCTS:

- Public Transport
- Electronic Toll Collection
- Loyalty Cards
- Event Ticketing
- Car Parking

### ADVANTAGES OF MIFARE CONTACTLESS SMART CARDS FOR TRANSPORT PAYMENTS

- ▶ Faster payments – read range up to 10 cm increasing the convenience of touch-and-go experience for passengers
- ▶ Increased efficiency and reduced cost – increased throughput by decreasing checkout times, reducing costs of cash handling and processing
- ▶ Improved customer experience – simplifying the purchases, enhancing customer convenience
- ▶ More security – providing a payment device with strong security features and reducing fraud
- ▶ A competent partner – MIFARE products are based on more than 15 years industry experience and application support along the supply chain
- ▶ Broad marketplace of solution developers and providers – based on the international standard ISO/IEC 14443 A and optional use of ISO/IEC 7816-4 commands
- ▶ Additional revenue – contactless payment convert cash payments into card payments, opportunity for additional revenue through interchange fees

## MORPHO'S MIFARE CLASSIC PRODUCT FAMILY

The MIFARE Classic family is the pioneer and front runner in contactless smart card ICs operating in the 13.56 MHz frequency range with read/write capability and ISO 14443 compliance.

### KEY FEATURES OF MIFARE CLASSIC FAMILY:

- Fully ISO/IEC 14443 Type A 1-3 compliant
- Available with ISO/IEC 14443-3 7byte unique identifier (7B UID) or 4 byte non-unique identifier (4B NUID)
- 1k or 4k EEPROM
- Available as contactless only or hybrid cards
- Simple fixed 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

## MORPHO'S MIFARE DESFIRE PRODUCT FAMILY

The chip's main characteristics are denoted by its name DESFire: DES indicates the commitment for high levels of security. Fire reflects its outstanding position as a Fast, Innovative and Reliable and Enhanced IC in the contactless proximity transaction market.

Morpho's MIFARE DESFire product family brings many benefits to end users. Cardholders can experience convenient contactless ticketing while also having the possibility to use the same device for applications such as closed-loop payment at vending machines, access management, loyalty or social services. In other words, the MIFARE DESFire silicon solution offers enhanced, consumer-friendly system design, in combination with security and reliability. The 70 pF option enables read range optimizations of small antenna form factors. Additionally, an automatic anti-team

mechanism is available for all file types, which guarantees transaction oriented data integrity. With Morpho's MIFARE DESFire products, data transfer rates up to 848 Kbit/s can be achieved, making fast data processing possible.

Featuring an on-chip backup management system and the mutual three pass authentication, Morpho's MIFARE DESFire cards can hold up to 28 different applications and 32 files per application. The size and access conditions of each file are defined at the moment of its creation, making MIFARE DESFire a truly flexible and convenient product.

MIFARE DESFire delivers the perfect balance of speed, performance and cost efficiency. Its open concept allows future seamless integration of other media such as smart paper tickets, key fobs and mobile ticketing based on Near Field Communication (NFC) technology. It is also fully compatible with the existing MIFARE reader hardware platform.

### KEY FEATURES OF MIFARE DESFIRE FAMILY:

- Fully ISO/IEC 14443 Type A 1-4 compliant
- 2, 4 or 8k EEPROM with fast programming
- Available as contactless only or hybrid cards
- Secure, high-speed command set
- High data rates according to ISO/IEC 14443-4: up to 848 Kbit/s
- Flexible file structure
- Choice of open DES/2K3DES/3K3DES/AES crypto algorithm in hardware
- Anti-collision
- Privacy protection
- Unique 7-byte serial number (ISO cascade level 2)
- Data integrity: CRC and bit counting on physical layer
- Common Criteria certification: EAL4+ for IC HW and SW

## MORPHO'S EMV PRO CL PRODUCT WITH MIFARE EMULATION

EMV Pro CL combines the advantages of a dual interface product with the speed and efficiency of a native operating system. Morpho's EMV Pro CL offers a multi-functionality in electronic payments and added value solutions. It comes with a built-in MIFARE 1K emulation opening up more use cases in multi-application scenarios. With the MIFARE support the dual interface product can be perfectly integrated in existing infrastructures such as transport, access control or ID-badges.

Certified by ACS (Advanced Card Systems Limited), EMV Pro CL is also compliant with global and national industry standards which play an important role in the transport market.

### KEY FEATURES OF EMV PRO CL:

- Highly secure platform for financial services
- Dual interface (contact and contactless interface)
- Native OS for faster performance
- Visa payWave qVSDC
- MasterCard PayPass M/Chip
- M/Chip Flex and M/Chip 2.1 support
- Conform to the Mastercard performance requirements of 2009
- ACS certified
- SDA / DDA / CDA support
- 12K EEPROM
- Flexible support for value added applications:
  - SmartyPlus Toolbox (loyalty, data storage, physical access, eGovernment etc.)
  - Welcome Real-time capable
  - Supports CAP and DPA
- Standardized personalization according to EMV CPS 1.1 and SCP02 (French scheme)
- Mifare 1K emulation

By using Morpho's multi-applicable product family of MIFARE, transit operators and banks will benefit from secure public transport transactions and reduced fraud while passengers can experience real convenient ticket purchase.

## KEY MISSIONS, KEY TECHNOLOGIES

### Morpho

Phone: + 49 (0) 43 47 715 0 - Fax: + 49 (0) 43 47 715 2212 - [www.morpho.com/e-documents](http://www.morpho.com/e-documents)  
Registered Office: Morpho Cards GmbH, Konrad-Zuse-Ring 1, 24220 Flintbek, Germany

