



# NXP® MIFARE Ultralight® EV1

## The easy and cost-efficient way to implement contactless limited-use tickets

The MIFARE Ultralight EV1 contactless IC is an ideal solution for limited-use smart paper tickets and cards, allowing easy and cost-efficient migration from traditional paper tickets and magnetic stripe schemes to purely contactless systems.

### KEY FEATURES

- ▶ Fully ISO/IEC 14443 A 3 compliant
- ▶ Backward-compatible with MIFARE Ultralight
- ▶ NFC Forum Type 2 Tag compliant
- ▶ 384- and 1024-bit user memory product variants
- ▶ OTP, lock bits, configurable counters
- ▶ Protected data access via 32-bit password
- ▶ Unique 7-byte serial number
- ▶ Three independent 24-bit one-way counters
- ▶ ECC supported NXP originality check
- ▶ Fast read command
- ▶ Anti-collision support
- ▶ Preparation for virtual card functionality
- ▶ Support of small form factors with a 50 pF input capacitance version
- ▶ 106 kbit/s communication speed
- ▶ Number of single write operations: 10.000
- ▶ 1.000.000 typical counter operations

### TARGET APPLICATIONS

- Limited-use smart paper tickets for
- ▶ Public transport
  - ▶ Event ticketing (stadiums, exhibitions, festivals, leisure parks, etc.)

### KEY BENEFITS

- ▶ Higher customer throughput
- ▶ Lower maintenance costs for the infrastructure
- ▶ Reduced cash handling
- ▶ Support for multi-operator transit system with 3 independent counters (e.g., bus, tram, metro)
- ▶ Ability to verify originality of tickets
- ▶ Increased convenience and reliability for end users compared to magnetic stripe, barcode and QR code-based tickets



## BEYOND CONTACTLESS SMART PAPER TICKETING

The MIFARE Ultralight EV1 is an ideal solution for limited-use smart paper tickets and cards, ideally suited for low cost, high-volume applications. It serves as the perfect contactless replacement for traditional paper tickets, magnetic stripe, barcode, and QR code-based systems. Equipped with password protection and an originality check function, it reflects the trend toward enhanced clone prevention in the limited ticketing space.

MIFARE Ultralight EV1 can be used in a range of form factors, from smart paper tickets and smart cards to wristbands, key fobs, and more. That extends the possibilities beyond traditional ticketing applications in public transport, opening up options for event ticketing, stadium access, amusement parks, music festivals, vouchers, loyalty cards, and more. Further, operators can create attractive offerings for locals and tourists by providing collectibles dedicated to specific events or locations.

## FASTER DEVELOPMENT

Proven toolkits, compliance with ISO/IEC 14443 A 3, and backward compatibility with MIFARE Ultralight provide developers a faster way to deliver best in class performance in limited-use ticketing applications. As MIFARE Ultralight EV1 is easy to integrate into existing MIFARE product-based installations, developers can quickly extend their deployments to include contactless, limited-use paper ticketing.

## SIMPLER MANUFACTURING

Flexible delivery formats, in sawn wafers or modules, simplify manufacturing and ease integration into existing production processes. 75 µm thin wafers enable paper tickets with a smooth surface.

## OPTIMIZED OPERATIONS

Service providers gain the benefits of reducing maintenance costs and greater fraud prevention, and can use the statistical data generated by the system to optimize operations.

## SELECTION GUIDE: MIFARE Ultralight product family

| Features          | MIFARE Ultralight EV1                     | MIFARE Ultralight C | MIFARE Ultralight Nano |
|-------------------|---|---------------------|------------------------|
| Memory            | 48/128 bytes                              | 144 bytes           | 40 bytes               |
| OTP Area          | 32 bit                                    | 32 bit              | 32 bit                 |
| Counter           | 3 x 24 bit                                | 1 x 16 bit          |                        |
| Access protection | 32-bit password<br>+ password acknowledge | 3DES                |                        |
| Fast read         | ✓   |                     |                        |
| Originality       | ✓   |                     | ✓<br>REPROGRAMMABLE    |

## ORDERING INFORMATION

| Packaging/ Input Capacitance         | MIFARE Ultralight EV1<br>384 bit User Memory | MIFARE Ultralight EV1<br>1024 bit User Memory |
|--------------------------------------|--|---|
| 17 pF                                | Part Type                                    |   |
| Sawn wafer 120 µm on FFC (AU-bumped) | MF0UL1101DUD                                 | MF0UL2101DUD                                  |
| Sawn wafer 75 µm on FFC (AU-bumped)  | MF0UL1101DUF                                 | MF0UL2101DUF                                  |
| MOA8 Module                          | --   | MF0UL2101DA8                                  |
| 50 pF                                | Part Type                                    |   |
| Sawn wafer 120 µm on FFC (AU-bumped) | MF0ULH1101DUD                                | MF0ULH2101DUD                                 |
| Sawn wafer 75 µm on FFC (AU-bumped)  | MF0ULH1101DUF                                | MF0ULH2101DUF                                 |

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