

| Product features | | Whit out on | Jille | | Habbit | | | | | | | | | | | | | | |
|--|----------------------------------|---|---------------------------|---|---------------------------|--|-----------------------------------|------------------------------------|--|-----------------------------------|-----------------------|---------------------------------|--------------|---------------------|---|---------------------------------------|--------------------------------|-------------------------------------|-----------------|
| | Nano | EV1 | _ | EV | | | | SE | × | | EV1 | | | 9 | EV1 | | | EV2 | |
| RF Interface | | | | | | | | | ISO/IEC1 | ISO/IEC 14443-2, Type A 13.56 MHz | 3.56 MHz | | | | | | | | |
| Protocol | | S | ISO/IEC 14443-3 | 3 | | | | 150, | ISO/IEC 14443-3&4 | | | | | | II/0SI | ISO/IEC 14443-4 | | | |
| UID – unique identifier | | 7-byte UID | | | | | 7-byte UII | 7-byte UID, 4-byte NUID, Random ID | Random ID | | | | | | 7-byte U | 7-byte UID, Random ID | | | |
| Communication speed | | | 106 Kbps | | | | | | | | | 106-848 Kbps | Kbps | | | | | | |
| Memory size [Bytes] | 40 | 48 128 | 8 144 | 1K | 4K | 2K | 4K | 1K | 2K | 4K | 2K | 4K | 526 | 2K | 4K | 8K | ZK | 4K | 8K |
| Memory model | | Compact, 4-byte page | yte page | | | | Compact | Compact, Sectors & 16-byte block | byte block | | | | | | Flexibl | Flexible file system | | | |
| Gypto | | | TDES | | 1-01 | | | J | Crypto-1, AES | | | | | | DES / 2K3DI | DES / 2K3DES / 3K3DES / AES | | | |
| Key length | | | 112-bit | it 48-bit Crypto-1 | rypto-1 | | | 48-bit G | 48-bit Crypto-1, 128-bit AES | AES | | | | | 128-bit AES, | 128-bit AES, up to 168-bit DES | | | |
| Authentication | | Password | | | | | | | | | 3-pass mutual | | | | | | | | |
| Communication security | | | | Encrypted | pted | | | Plain, CMAC | Plain, CMACed, Encrypted w. CMAC | : CMAC | | | | | Plain, CMACed | Plain, CMACed, Encrypted w. CMAC | AC | | |
| MlsmartApp | | | | | | | 1 | | | | | | | | | | | > | |
| Transaction MAC | | | | | | | | | | | > | | | | | | | > | |
| Multi key sets | | | | | | | | | | | | | | | | | | > | |
| Proximity check | | | | | | | | | | > | | | | | | | | > | |
| Virtual card select | | | | | | | | | > | | | | | | | | | . > | |
| eatures | ECC signature re-programmable | ECC signature | | ECC sign | signature | | AES | AES originality keys | 2 | | AES originality keys, | lity keys, | | | | | AES origina | AES originality keys, ECC signature | gnature |
| CC Certification | | | , | | | EAL4+ | + | 1 | EAL4+ | ± | EALS+ | + | | EAI | EAL4+ | | | EAL5+ | |
| ISO 7816-4 APDU | | | | | | | | | | | > | | | | | > | | | |
| NFC compliance | | NFC Forum | | Not supported by | orted by | | NFC | NFC capable in SL3 | | | NFC capabillities | illities | | | NFCFor | NFC Forum Tag Type 4 | | | |
| | ta | tagtype 2 compliant | ant | majority of N | of NFC devices | | | | | | in SL1 and SL3 | nd SL3 | | | V2.0 | V2.0 compliant | | | |
| Target applications | Publictr. Loyalty pr | Public transport & event ticketing Loyalty programs, limited use tickets | ticketing use tickets | Various applications – recommended to move to higher security ICs | lications – ed to move | | | Public trar ace | Public transport / campus cards , access management | ards / | | | | Smart cit microp | Smart city platform / advanced mobility multi-applications / micropayment / loyalty programs / access management | rced mobility mul rograms / access | ti-applications, management | _ | |
| Input capacitance [pF] | | 17/5 | | 17 / 50 | 20 | | | 17 | | | 17 / 70 | 0, | | | _ | 17 / 70 | | | |
| Multi applications | | - | | Supported via MAD | via MAD | | | dns | supported via MAD | | | | | | P | dynamic | | | |
| Delivery types – 7 Byte UID | 0 | | | | | | | | | | | | | | | | | | |
| Wafer 120 μm / 17 p F | MF0UN0001 | 101 M | 2101 MF0ICU200 | | MF157001 | MF1SSO01X MF1S7001 MF1SPLUS6001 MF1SPLUS8001 MF1SP1001 MF1PLUS6001 MF1PLUS8001 | WF1SPLUS8001 | MF1SEP1001 | MF1PLUS6001 | MF1 PLUS 8001 | MF1P2101 | MF1P4101 | MF3ICDQ101 | MF3ICD2101 | MF3ICD4101 | MF3ICD8101 | MF3D2201 | 10 | MF3D8201 |
| - | ono | and and | | | /: andx | UND. | nana. | nana. | nnn | | - | DUDI | DUD | DOD | DOD | DUU | DOUD | DUU | DOUD |
| Wafer 120 µm / high cap | MF0UN0001 DUF | MFOULH1101MFOULH2101 DUD DUD | 42101 MF0ICUZ101 D DUD | • | | | | | | | | _ | MESICUMUNION | MF3ICDH2101 DUD | MF3ICDH4101 DUD | MF3ICDH8101 DUD | MF3DH2201 DUD | | DUD |
| Wafer 75 µm / 17pF | MF0UNH0001 | 101 | 2101 | MF155001X | 11X MF157001 | | | | | | MF1P2101 | MF1P4101 | MF3ICDQ101 | MF3ICD2101 | MF3ICD4101 | MF3ICD8101 | MF3D2201 | MF3D4201 | MF3D8201 |
| | 989 | DUF DUF | | DUF: | V NOIL | | | | | | + | 5 | DUF | MESICELISTO | MEDICALIATO | MESICALISTO | 5 | 5 | DUF |
| Wafer 75 µm / high cap | MF0UNH0001 DUF | MFOULHTTOT MFOULHZTO DUF DUF | H2101 | , | ī | , | , | , | , | , | MFIPHZIUI U | Mr IPH4101 DUF ¹⁾ | MESICURIQUO | MESICUHZIOI DUF | MF3ICUF4101 DUF | MESICUHSIUI | | | MF3DH8201 |
| M0A4 / 17pF | - | - | MF0M0UZ00 | - 100 | | MF15PLUS6001 MF15PLUS8001 | | MF1SEP1001 | MF1PLUS6001 MF1PLUS8001 | MF1 PLUS 8001 | MF1P2100 | MF1P4100 | | MF3M0D2101 | MF3M0D4101 | MF3M0D8101 | MF3D2200 | MF3D4200 N | MF3D8200 |
| | | | MF0M0U2101 | oi MF1S5000 | MF157000 | | | | | T | 8 | MF1PH4100 | | MF3M0DH2101 | MF3MODH2101 MF3MODH4101 MF3MODH8101 MF3DH2200 MF3DH4200 MF3DH8200 | MF3M0DH8101 | MF3DH2200 | MF3DH4200 M | F3DH8200 |
| MOA4 / high cap | | | DA4 | | - | | | | | _ | _ | DA41) | | DA4 | DA4 | DA4 | DA4 | DA4 | DA4 |
| M0A8 / 17 pF | 1 | MF0UL210 | MFOULZ101 MFOMOUZ001 | , | | MF15PLUS6001 MF15PLUS8001 DA81) | MF1SPLUS8001 DA8 ¹⁾ | MF1SEP1001 | MF1SEP1001 MF1PLUS6001 MF1PLUS8001 DA8 ¹⁾ DA8 ¹⁾ DA8 ¹⁾ | MF1PLUS8001 DA8 ¹⁾ | , | | MF3M0DQ101 | MF3M0D2101 DA8 | MF3M0D4101 DA8 | MF3M0D8101 DA8 | | | |
| MOA8 / high cap | | ' | | MF155000 | MF157000 | | , | | | , | | Ī | AF3MODHQ101 | MF3 M0DH2101 | MF3MODHQ101 MF3MODH2101 MF3MODH4101 MF3MODH8101 | MF3M0DH8101 | | | |
| | | | | | V DAUA | | | | | | METDOTO | METDATOO | UNO | UNO | UNO | UNO | MEDDOOD | A COCACCIAN | OUCOUCHY |
| M086 / 17pF | 1 | 1 | | , | | , | , | , | , | 1 | | MF IP4100 DA6 ¹⁾ | | | | | MF3D2200 DA6 | Mr 3D4z00 | MF3D8ZUU DA6 |
| MOB6 / high cap | | | ' | | , | | | | | | MF1PH2100 | MF1PH4100 | | | | | MF3DH2200 | MF3DH2200 MF3DH4200 MF3DH8200 | 1F3DH8200 |
| Jan | | | | | | | | | | | DA61) | DA61) | | | | | DA6 | DA6 | DA6 |
| ال available also in legacy 4 byte NUID | yte NUID | | | | | | | | | | | | | | | | | | |

MIFARE and NFC rea

| tupod | | | N | NFC frontend solutions | tions | | | | NFC cont | NFC controller solutions | | HITAG |
|--|--|---|--|--|---|--|---|--|--|---|--|---|
| 12000 | MFRC522 | MFRC523 | MFRC630 | MFRC631 | CLRC663 | PN512 | PN5180 | PN532 | PN533 | PN7120 | PR601 | HTRC110 |
| Standards | Standard 3 V ISO/IEC14443A MIEARF frontend | Standard 3 V ISO/IEC 14443 frontend | High-performance ISO/IEC 14443A MIEARE | High-performance High-performance ISO/IEC 14443 multi-protocol | High-performance multi-protocol | Fully NFC Forum compliant | High-performance, multi protocol | NFC controller with integrated FW | USB NFC controller with integrated FW | Ful I NFC Forum-compliant controller with NCI interface | High-performance multi-protocol NFC controller | Highly integrated optimized HITAG short range reader/writer |
| Integrated microcontroller | - | - | - | | - | | - | integrated FW | integrated FW | integrated FW | erFW | - |
| Carrier frequency [MHz] | 13.56 | 13.56 | 13.56 | 13.56 | 13.56 | 13.56 | 13,56 | 13.56 | 13.56 | 13.56 | 13.56 (1) | 0.125 |
| Standards & protocols | | | | | | | | | | | | |
| Reader / writer | ISO/IEC 14443 A | ISO/IEC 14443 | ISO/IEC 14443 A | ISO/IEC 14443 | ISO/IEC 18092 ISO/IEC 14443 ISO/IEC 15693 FeliGa | ISO/IEC 18092 ISO/IEC 14443 FeliGa | ISO/IEC 18092 ISO/IEC 14443 ISO/IEC 15693 FeliCa | ISO/IEC 18092 ISO/IEC 14443 FeliCa | ISO/IEC 18092 ISO/IEC 14443 FeliCa | ISO/IEC 18092 ISO/IEC 14443 ISO/IEC 15693 FeliCa | 150/IEC18092 150/IEC14443 150/IEC15693 FeliCa | HITAG |
| NFC tag type support | 1,2,4 | 1,2,4 | 1, 2, 4 | 1, 2, 4 | 1, 2, 3, 4 | 1, 2, 3, 4 | 1,2,3,4,5 | 1, 2, 3, 4 | 1, 2, 3, 4 | 1, 2, 3, 4 | 1, 2, 3, 4 | |
| ISO/IEC 14443 Baud-rate [KBit/s] | 106/212/424/848 | 106/212/424/848 | 106/212/424/848 | 106/212/424/848 | 106/212/424/848 | 106/212/424 | 106/212/424/848 | 106/212/424 | 106/212/424/848 | 106/212/424/848 | 106/212/424/848 | Up to 4K |
| FeliCa Baud-rate [KBit/s] | - | - | - | - | 212/424 | 212/424 | 212/424 | 212/424 | 212/424 | 212/424 | 212/424 | |
| MIFARE Classic support (license included) | <i>></i> | ` | ^ | > | ` | ` | > | > | ` | ` | > | |
| ISO/IEC 15693 Baud-rate [KBit/s] | - | - | - | , | 26.5/53 | | 26.5/53 | - | | 1.66/26.5 | 26.5/53 | - |
| EPC class-1 HF / ISO/IEC 18000-3M3 | - | - | - | - | ^ | - | > | - | - | - | ^ | 1 |
| EMVG compliance | - | ^ | 1 | ^ | > | ^ | > | > | 1 | ^ | > | 1 |
| Card emulation | | | | | | > | > | > | > | > | | |
| NFC tag type emulation | - | - | | - | - | 2, 3, 4 | 1,2,3,4,5 | 2,3,4 | 2, 3, 4 | 1, 2, 3, 4 | | |
| NFC tag type Baud-rate [KBit/s] | - | 1 | - | - | - | 106/212/424 | 106/212/424/848 | 106/212/424 | 106/212/424 | 106/212/424 | - | - |
| Peer-to-peer (ISO/IEC 18092) | - | - | - | | ^ | ^ | ` | ^ | ^ | ^ | ^ | |
| Passive communication | - | - | - | - | Initiator | Initiator/Target | Initiator/Target | Initiator/Target | Initiator/Target | Initiator/Target | Initiator | - |
| Active communication | - | 1 | - | , | - | Initiator/Target | Initiator/Target | Initiator/Target | Initiator/Target | Initiator/Target | - | - |
| Product features | | | | | | | | | | · | | |
| Operating distance up to [mm] | 70 | 70 | 120 | 120 | 120/160 | 70 | 120/160 | 70 | 70 | 70 | 120/160 | up to 200 w.o. booster |
| RF transmitter supply voltage [V] | 3.6 | 3.6 | 3.3 to 5 | 3.3 to 5 | 3.3 to 5 | 3.6 | 5.5 | 3.6 | 2.5 to 3.6 | 3.1 | 3.3 to 5 | 5 |
| Transmitter supply current, typ [mA] | 100 | 100 | 250 | 250 | 250 | 100 | 250 | 09 | 09 | 09 | 200 | 200 |
| Host interface | SPI, I ² C, UART | SPI, I ² C, UART | SPI, I ² C, UART | SPI, I ² C, UART | SPI, I ² C, UART | SPI, I ² C, UART | SPI | SPI, I ² C, UART | USB, UART | Ρ̈́C | SPI, I ² C, UART | Serial 2/3 wire |
| Supply voltage host interface [V] | 2.5 to 3.6 | 2.5 to 3.6 | 3.3 to 5.0 | 3.3 to 5.0 | 3.3 to 5.0 | 2.5 to 3.6 | 1.8 or 3.3 | 2.5 to 3.6 | UART: 1.8 or 3.3 USB: 5 | 1.8 or 3.3 | 3.3 to 5.0 | 5 |
| Idle mode current, typ [µA] | | | 9 | 9 | 9 | | 2-May | | | | 9 | 200 |
| Power-down mode current, typ [µA] | 5 | 5 | 0.008 | 800.0 | 0.008 | 5 | 10 | 2 | 10 | 10.5 | 0.008 | 7 |
| Power-down mode with RF level detector on [µA] | • | ı | ı | - | 1 | 10 | | 25 | 30 | 20 | 1 | |
| Low-power card detection mode [μΑ] | | | 0.5 | 0.5 | 0.5 | | 0.5 | | | 150 | 0.5 | |
| Temperature range [°C] | -25 to +85 | -25 to +85 | -25 to +85 | -25 to +85 | -25 to +85 | -30 to +85 | -30 to +85 | -25 to +85 | -25to +85 | -30 to +85 | -25 to +70 | -40 to +85 |
| Security features | | | | | | | | | | | | |
| MIFARE SAM support in X-mode | SAM AV1 & AV2 | SAM AV1 & AV2 | SAM AV 2.6 | SAM AV 2.6 | SAM AV 2.6 | SAM AV1 & AV2 | | | | | SAM AV 2.6 | |
| MIFARE Classic security (CRYPT01 HW) | ` | > | > | > | > | > | > | > | > | > | > | |
| Product support & ordering information | | | | | | | | | | | | |
| Package | HVQFN32 | HVQFN3.2 | HVQFN3.2 | HVQFN3.2 | HVQFN32 | HVQFN32 HVQFN40 TFBGA64 | HVQFN40, TFBGA64 | HVQFN40 | HVQFN40 | VFBGA49 | LQFP100 | 5014 |
| Producttype | MFRC52202HN1 | MFRC52302HN1 | MFRC63002HN | MFRC63102HN | CLRC66302HN | PN5120A0HN1/C2 | PN5180A0HN/C1 | PN5321A3HN/106 | PN5331B3HN/270 | PN7120A0EV/C10801Y | PR601HL/C1 | HTRC11001T/02EE |
| Software | | | | | | | | | | | | |
| NFC Reader Library | > | ` | ` | > | > | ` | > | | | ` | > | |
| NFC Forum reference implementation | | | | | | > | | > | | | | |
| other | | | | | | | | HAL, card emulation example | HAL, card emulation example IISB PCSC driver | | Various implementation examples | Control library HTRC110 |
| | | | | | | | | | | | | |

| Product | | ¥ | FARE im | MIFARE implementations | ntation | SI | | | | | Features | es | | |
|---------------------|-------------------|-------------------|------------------|---------------------------------|-----------------------|-----------------------|-----------------------|---------------|---------------|--------------------|---------------|----------------|------------------------------|---------------|
| | | Ava | ilable ca | Available card IC functionality | ctionali | ty | | | UID options | ns su | Parameters | Exit on | on | MIFARE select |
| | MIFARE Classic 1K | MIFARE Classic 4K | MIFARE Plus X 2K | MIFARE Plus X 4K | WIEARE DESFire EV1 2K | MIFARE DESFire EV1 4K | MIFARE DESFire EV1 8K | 7 Byte UID | 4Byte NUID | 4Byte Random ID | | incomplete SAK | Time out UART RF-Field | |
| P5Cx145 | | | | | | | | | | | | | | |
| CD128Cx081 | | | | | | | | | | | | | | |
| CD051 | > | > | | | | | | > | > | > | ATQA,SAK,ATS | | > | N/A |
| CD041 | | | | | | | | | | | | | | |
| CD021/CD016 | | | , | | , | , | , | | | | | | | |
| P5Cx081V1D/CD041V1D | | | | | | | | | | | | | | |
| CD021V1D | | | | | > | > | > | > | | | ATS | 1 | | N/A |
| CD016V1D | , | 1 | , | , | | | | | | | | | | |
| P5Cx144 | | | | | | | | | | | | | | |
| Cx080/CD040 | > | > | | | | | | > | | | ATQA,SAK,ATS | , | > | ΝA |
| CD020/CD012 | | | , | | | | | | | | | | | |
| P5Cx145 | ` | ` | | | ` | > | ` | ` | ` | ` | ATOA CAK ATS | | > | V/W |
| CD128 | | | | | | | | | | | כותאותכיתאות | | • | VA |
| P60D144M | > | > | > | ` | | | | > | > | > | ATQA,SAK,ATS | ` | ` | |
| P60D080M | > | > | > | > | | | | > | > | > | ATQA,SAK,ATS | <i>></i> | ^ | |
| P60D024M | > | > | > | > | | | | > | > | > | ATQA,SAK,ATS | > | > | ı |
| P60D144D | | | | | > | ` | ^ | ^ | ^ | ^ | ATQA,SAK,ATS | > | ^ | |
| P60D080D | | | | | ` | ^ | ^ | ^ | ^ | ^ | ATQA,SAK,ATS | ^ | ^ | |
| P60D024D | | | | | > | > | > | > | > | > | ATQA,SAK,ATS | > | > | 1 |
| P60N144J | ^ | > | > | > | > | ` | > | > | ^ | ^ | ATQA,SAK,ATS | > | ^ | > |
| P60D144J | ^ | > | > | ^ | > | ^ | ^ | > | > | > | ATQA,SAK,ATS | > | ^ | > |
| P60D080J | > | > | > | ` | , | / | · | ` | , | , | ATOA CAIV ATC | > | 1 | > |

| D5Cv145 | | _ | | | | | | _ | | |
|--------------------------------------|--------------|----------|---|---|-----------|------------|--|--|--------|--|
| CD128Cx081 | , | `` | | | | | | ` | ` | |
| CD041 | | • | | | | | | | | |
| P5Cx081V1D/CD041V1D | | | | | | | | | | |
| G021V1D | | | | | > | > | > | > | | |
| P5Cx144 | | | 1 | 1 | | | | | | |
| Cx080/CD040 | > | > | | | | | | > | | |
| P5Cx145 | | | | | | | | | | |
| CD128 | > | > | | | > | > | > | > | > | |
| P60D144M | > | ` | > | > | | | | > | > | |
| P60D080M | ^ | > | ^ | ^ | | | | 1 | ^ | |
| P60D024M | > | > | > | > | | | | > | > | |
| P60D144D | | | | | > | > | > | > | > | |
| P60D080D | | | | | > | > | > | > | > | |
| P60D024D | \ | , | | , | > ' | > ' | > ' | > ' | > | |
| P60N144J | > | > ` | > ` | > ` | > ` | > ` | > ` | > ` | > | |
| P600 144J | > | > | > > | > > | > | > | > | > > | > | |
| 000000 | | | | | | | | | | |
| MILANE - SAIV | SAIM (Secure | care | ACC | Access Modules) | MEA | les) | | | | |
| Product features | | | | | MIFA | MIFARE SAM | | | | |
| | | | A | AV1 | | | ٧ | AV2 | | |
| Communication interface | | 1S0 T | /IEC 7816 = 1, up to ² C inter | ISO/IEC 7816, Class A, B, C T = 1, up to 1.5 Mbps $ ^{2}C$ interface to | 8, C 8 | | SO/IEC 78 $T = 1, \text{ up}$ $I^2 \text{C int}$ | ISO/IEC 7816, Class A, B T = 1, up to 1.5 Mbps I ² C interface to | | |
| | | 1 | MFRC52) | MFRC52X, PN51X | | MF | RC52X, P. | MFRC52X, PN51X, CLRC66x | x9 | |
| Cryptographic algorithms | | E P | 112-bit a MIFARE ES-128 ar | TDEA 112-bit and 168-bit key MIFARE Crypto-1 AES-128 and AES-192 | it key | Ë | A 112-bit MIFARE AES-128a SA-up to | TDEA 112-bit and 168-bit key MIFARE Crypto-1 AES-128 and AES-192 RSA-up to 2048-bit key | key , | |
| Public key infrastructure (PKI) | KI) | | | | | = | - | > | ì | |
| Hash Tunction | | | MILADI | AMEAN Classic | | STA. | I, SHA-Z | SHA-1, SHA-224 and SHA-256. | 726. | |
| Supported cryptography | | | MIFARE U MIFARE U MIFARE MIFARE DI | MIFAKE CLASSIC MIFARE Ultralight C MIFARE DESFire MIFARE DESFire EV1 | | | MIFAF MIFAE MIFA MIFAE MIFAE | MIFARE Classic MIFARE Ultralight C MIFARE Plus MIFARE DESFire | | |
| Secure host communication | | | ľ | | | | | > | | |
| X- functionalities | | | , | | | | | ^ | | |
| Unique serial number [Bytes] | [S2] | | - | 7 | | | | 7 | | |
| True random number generator | rator | | , | | | | | ` | | |
| No of symmetric key entry | | 128 | (3 keys p | 128 (3 keys per key entry) | (k | 12 | .8 (3 keys | 128 (3 keys per key entry) | S | |
| Acress conditions | | | nor | ntrv | | | 700 | ontrv | | |
| Key usages counter | | | Par C | per entry 16 | | | 5 | per entry 16 | | |
| Key diversification | | | Enayptic | Encryption based | | | Encrypt | Encryption based | | |
| RSA | | | | | | Signat | ure, Encry | Signature, Encryption for updating symmetric key entry | dating | |
| DES/3DES security | | Σ | ACing/En | MACing/Endpherment | Ħ | | MACing/Ei | MACing/Endpherment | | |
| AES 128 security | | W | ACing/En | MACing/Endpherment | Ħ | | /AACing/E | MACing/Endpherment | | |
| Delivery types PCM1.1 contact module | | | , | | | | | > | | |
| HVQFN | | | HVQI | HVQFN32 | | | HW | HVQFN32 | | |
| | | P5 | DF072EV | P5DF072EV2/T0PD4090 | 90 | | P5I | P5DF081 | | |

| | 1 | |
|--|---|-------------------------------|
| Products | Short description | Supported NXP platforms |
| NXP Original ity Checker reader (Windows) | Enables anyone in the supply chain to check the originality of NXP contactless ICs | MIFARE NTAG ICODE SLIX2 |
| MIFARE Reader-Writer Kit (Windows) | Consists of the Pegoda II MIFARE reference design reader-writer, a set of MIFARE family tag samples and the RFIDDiscover tool | MIFARE NTAG ICODE |
| RFID Discover (Windows) | Allows easy access to the commands of any NXP 13.56Mhz contactless IC with the dick of a button | MIFARE NTAG ICODE |
| MICADE CDV (Andreid | Facilitates App Development by providing a | MIFARE |

For further details please refer to: www.MIFARE.net



| Product features | NTAG® 210µ | NTAG® 210 | NTAG® 212 | NTAG® 213 / 213F | NTAG*215 | NTAG® 216 / 216F | NTAG® I'C 1K | NTAG® I'C 2K | NTAG® I'C plus 1K | NTAG [®] I ² C plus 2K |
|--------------------------------------|--|---|---|---|---|--|---|---|---|--|
| Memory | | | | | | | | | | |
| NFC Forum type | NFC Type 2 Tag | NFC Type 2 Tag | NFC Type 2 Tag | NFCType 2 Tag | NFC Type 2 Tag | NFC Type 2 Tag | NFC Type 2 Tag | NFC Type 2 Tag | NFC Type 2 Tag | NFC Type 2 Tag |
| EEP ROM size [byte] | 80 (20 pages á 4 byte) | 80 (20 pages á 4 byte) | 164 (41 pages á 4 byte) | 180 (45 pages á 4 byte) | 540 (135 pages á 4 byte) | 924 (231 pages á 4 byte) | 1024 | 2048 | 1024 | 2048 |
| User memory [byte] | 48 | 48 | 128 | 144 | 504 | 888 | 888 | 1904 | 888 | 1912 |
| Write endurance [cydes] | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 200000 | 200 000 | 200 000 | 200 000 |
| Data retention [yrs] | 10 | 10 | 10 | 10 | 10 | 10 | 20 | 20 | 20 | 20 |
| RF-Interface | | | | | | | | | | |
| According to | ISO14443A (up to layer 3) NFC Forum Type 2 Tag | ISO14443A (up to layer 3) NFC Forum Type 2 Tag | ISO14443A (up to layer 3) NFC Forum Type 2 Tag | ISO14443A (up to layer 3) NFC Forum Type 2 Tag | ISO14443A (up to layer 3) NFC Forum Type 2 Tag | ISO14443A (up to layer 3) NFC Forum Type 2 Tag | ISO14443A (up to layer 3) NFC Forum Type 2 Tag | ISO14443A (up to layer 3) NFC Forum Type 2 Tag | ISO14443A 1-3 NFC Forum Type 2 Tag | ISO14443A 1-3 NFC Forum Type 2 Tag |
| Frequency [MHz] | 13.56 | 13.56 | 13.56 | 13.56 | 13.56 | 13.56 | 13.56 | 13.56 | 13.56 | 13.56 |
| Baud-rate[KBit/s] | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 | 106 |
| Anticollision | bit-wise | bit-wise | bit-wise | bit-wise | bit-wise | bit-wise | bit-wise | bit-wise | bit-wise | bit-wise |
| Security | | | | | | | | | | |
| Unique serial n umber [byte] | 7, cascaded | 7, cascaded | 7, cascaded | 7, cascaded | 7, cascaded | 7, cascaded | 7, cascaded | 7, cascaded | 7, cascaded | 7, cascaded |
| Access keys | | 32bit | 32 bit | 32bit | 32 bit | 32 bit | | | 32 bit | 32 bit |
| Access conditions | - | write, read and write | write, read and write | read, read and write | read, read and write | read, read and write | read, read and write | read, read and write | read, read and write | read, read and write |
| Write protection | | blockwise | blockwise | blockwise | blockwise | blockwise | blockwise | blockwise | blockwise | blockwise |
| Security | • | password | password | password | password | password | | | password | password |
| Special features | | | | | | | | | | |
| Field detection pin | - | - | | ✓ 1 (configurable) | - | √1 (configurable) | ✓ (configurable) | ✓ (configurable) | ✓ (configurable) | ✓ (configurable) |
| 1 ² C interface | | | | | | | ` | ` | ` | ` |
| Others | Originality check with customizable (reprogrammable) originality signature | UID ASCII mirror Originality check Fast Read | UID ASCII mirror Originality check Fast Read | UID ASCII mirror NFC counter NFC counter ASCII mirror Originality check Fast Read Sleep mode via FD pin ¹ | UID ASCII mirror NFC counter NFC counter ASCII mirror Originality check Fast Read | UID ASCII mirror NEc counter NEc counter ASCII mirror Originality check Fast Read Sleep mode via FD pin ¹ Sleep mode via FD pin ¹ | ■ Passthrough mode 64 bytes SRAM buffer ■ Energy harvesting | Passthrough mode 64 bytes SRAM buffer Energy harvesting | Passthrough mode via 64 bytes SRAM Energy harvesting Tamb = 105°C | Passthrough mode via 64 bytes SRAM Energy harvesting Tamb = 105° C |
| Packages & capacitance types | | | | | | | | | | |
| Sawn wafer (Au-Bumped) | M72L1001G0DUD M72H1001G0DUD | NT2L1011G0DUD | | NT2H1311G0DUD | NT2H1511G0DUD | NT2H1611G0DUD | NT3H1101W0FUG | NT3H1201W0FUG | NT3H2111W0FUG | NT3 H2211 W0FUG |
| HXS0N4 (S0T1192-1) | | | | NT2H1311F0DTL ¹ | | NT2H1611F0DTL ¹ | | | | |
| XQFN8 | | - | - | | - | - | NT3H1101FHK | NT3H1201FHK | NT3 H2111 W0FHK | NT3H221W01FHK |
| TSS0P8 | | - | | , | , | ' | NT3H1101FTT | NT3H1201FTT | NT3H2111W0FTT | NT3H2211W0FTT |
| MOA8 | | | | NT2H1311G0DA8 | NT2H1511G0DA8 | NT2H1611G0DA8 | | | NT3H2111W0FT1 | NT3H2211W0FT1 |
| Cres Capacitance [pF] | 17/50 | 17 | 17 | 20 | 20 | 50 | 50 | 50 | 50 | 20 |
| ¹ NTAG 21x F version only | | | | | | | | | | |



| ו וממתרו במותובז | - | 7 | 256 | 2048 | <u>s.</u> | Advanced | Advanced + | 24 |
|---------------------------|--|--|-------------------------|----------------------------|-----------------------|---------------------------|---------------------------|-----------------------|
| Memory | | | | | | | | |
| Size [bit] | 2048 | 256 | 256 | 2048 | 128 | 512 | 1760 | 64 |
| Write endurance [cycles] | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | |
| Data retention [yrs] | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Organisation | 64 blocks á 4 bytes | 8 blocks á 4 bytes | 8 blocks á 4 bytes | 64 blocks á 4 bytes | 4 blocks á 4 bytes | 16 blocks á 4 bytes | 55 blocks á 4 bytes | 2 blocks á 4 bytes |
| RF Interface | | | | | | | | |
| According to | HITAG 1 | HITAG 2 ISO 11784/85 | HITAG1+ ISO 11784/85 | HITAG1+ ISO 11784/85 | 150 1 1784/85 | ISO 11784/85 ISO 14223 | ISO 11784/85 ISO 14223 | |
| Frequency | 100-150 kHz | 100-150 kHz | 100-150 kHz | 100-150 kHz | 100-150 kHz | 100-150 kHz | 100-150 kHz | 100-150 kHz |
| Baud-rate[KBit/s] | up to 4 | up to 4 | up to 8 | up to 8 | up to 8 | up to 8 | up to 8 | |
| Anti-collision | collision detection | , | collision detection | collision detection | | collision detection | collision detection | |
| Security | | | | | | | | |
| Unique ID [byte] | 4 | 4 | 4 | 4 | 9 | 9 | 9 | 5 |
| Access keys | 32 bit | 48 bit | 48 bit | 48 bit | 32 bit | 32 bit | 32 bit | |
| Access conditions | Encrypted mutual authentication or plain | Encrypted mutual a uthentication or plain | Authentication or plain | Authentication or plain | Plain, password | Plain, password | Plain, password | |
| Encryption algorithm | > | > | for authentication only | for authentication only | | , | | |
| Special features | | | | | | | | |
| TTF modes | | ^ | ^ | ^ | ^ | ^ | ^ | ^ |
| RTF modes | > | ` | > | > | 1 | ` | > | |
| Write ISO 11785 | | | | - | ^ | ^ | ^ | |
| Delivery types | | | | | | | | |
| Sawn wafer (Au Megabump) | | | HTS IC CS6 01EW/C7 | HTS IC C48 01EW/C7 | > | > | > | > |
| Sawn wafer (Au bump) | HT1 IC S30 02W/V6F | HT2 IC S2002W/V6F/R | HTS IC H56 01EW/V7 | HTS IC H48 01EW/V7 | | | - | |
| M0A4 | HT1 M0A4 S30/E/3 | HT2 M0A4 S20/E/3/R | HTS MO H56 02EV | HTS M0 H48 02 EV | | | | |
| S0T385-1 (Stick) | , | HT2 DC20 S20/F/R | | | 1 | 1 | | ı |
| S0T1122 | | | | | HTMS8001FTB/AF | HTMS8101FTB/AF | HTMS8201FTB/AF | |
| HVS0N2 | - | - | HTS H56 01 ETK | HTS H48 01 ETK | HTMS8001FTK/AF | HTMS8101FTK/AF | HTMS8201FTK/AF | - |
| Capacitance 210pF +/- 10% | ^ | ^ | - | - | - | - | - | - |
| Capacitance 210pF +/- 5% | - | - | 1 | ^ | - | - | - | |
| Capacitance 210pF +/- 3% | | | | | | | - | |
| Canacitance 280nF ± /- 5% | | , | | | HTMS8001FIIG/AM | HTMS8101FIIG/AM | HTMS8201FIIG/AM | HTCICC6403FIIG/AM |



| Product features | ICODE® SLI-L | ICODE® SLIX-L | ICODE® SLI | ICODE ® SLIX | ICODE® SLI-S | ICODE® SLIX-S | ICODE® SLIX 2 | ICODE® ILT | ICODE® ILT-M | ICODE® DNA |
|-----------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---|----------------------------|----------------------------|--|---|----------------------------------|
| Standard | ISO 18000-3M1 ISO 15693 | ISO 18000-3M1 ISO 15693 | ISO 18000-3M1 ISO 15693 | ISO 18000-3M1 ISO 15693 | ISO 18000-3M1 ISO 15693 EPCClass 1 ² | ISO 18000-3M1 ISO 15693 | ISO 18000-3M1 ISO 15693 | EPC Class-1 HF ¹ ISO 18000-3M3 | EPC Class-1 HF ¹ ISO 18000-3 M3 | ISO 18000-3M1 ISO 15693-2, 3 |
| User memory [bit] | 256 | 256 | 968 | 968 | 1280 | 1280 | 2528 | , | 512 | 2016 |
| EPC code size [bit] | , | , | | , | 96 | , | , | up to 240 | up to 240 | |
| UID (TID ¹) size[bit] | 64 | 49 | 2 | 64 | 2 | 49 | 49 | (QIL) 96 | (GIT) 96 | 46 |
| Data re tention [Years] | 10 | 20 | 10 | 90 | 10 | 20 | 20 | 50 | 20 | 90 |
| Write endurance [cycles] | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 |
| Anticollision speed | up to 60 units/s | up to 60 units/s up to 200 units/s ² | up to 60 units/s | 90 units/s ³ | up to 700 units/s | up to 700 units/sc | up to 90 units/s ³ |
| Fast inventory | > | > | > | > | > | > | > | | | > |
| Security Functions | | | | | | | | | | |
| EAS | > | > | ` | > | > | > | > | > | > | > |
| EAS password protection | 32 bit password | 32 bit password | 1 | 32 bit password | 32 bit password | 32 bit password | 32 bit password | 32 bit password | 32 bit password | AES - 128 bit |
| EAS selective | > | > | | | > | > | > | | | |
| AFI | > | > | > | > | > | > | > | | | > |
| AFI password protection | - | 32 bit password | | 32 bit password | | 32 bit password | 32 bit password | - | | > |
| Persistent giet | - | | 1 | 1 | | 1 | > | | | > |
| Memory write lock | > | ` | ` | > | > | > | > | > | > | |
| Memory access password protection | | | , | , | 32 bit password | 32 bit password | 32 bit password | | , | AES - 128 bit |
| Privacy password protection | 32 bit password | 32 bit password | | - | 32 bit password | 32 bit password | 32 bit password | 32 bit password | 32 bit password | AES - 128 bit |
| Destroy password protection | 32 bit password | 32 bit password | | - | 32 bit password | 32 bit password | 32 bit password | - | - | AES - 128 bit |
| Counter | | | | | , | | ` | | | |
| Originality signature | - | 1 | T | 1 | 1 | 1 | ^ | - | 1 | re-programmable |
| Cres capacitance [pF] | 23 / 97 | 23 / 97 | 23 | no/23/97 | 23 / 97 | 23 / 97 | 23 | 0 / 23 / 97 | 0/23/97 | 23.5 |
| Delivery types | | | | | | | | | | |
| Wafer FFC | SL2ICS5001EW/V7 | SL2S5002FUD | SL2ICS2001DW/V1D | SL2S2002FUD | SL2ICS5301EW/V7 | SL255302FUD | SL2S2602FUD | SL2S1502FUD | SL2S1512FUD | SL2S6002FUD/BG |
| Wafer FCC – HC | SL2ICS5101EW/V7 | SL2S5102FUD | | SL2S2102FUD | SL2ICS5401EW/V7 | SL2S5402FUD | | SL2S1602FUD | SL2S1612FUD | |
| Wafer FCC- NC | | | , | SL2S2202FUD | , | | | SL2S1402FUD | SL2S1412FUD | - |
| S0T1122 | - | SL2S5002FTB | 1 | SL2S2002FTB | - | SL2S5302FTB | - | SL2S1502FTB | SL2S1512FTB | - |
| S0T1122-HC | | - | | SL2S2102FTB | | , | , | • | SL2S1612FTB | |
| S0T1122- NC | | | | , | | | , | | SL2S1412FTB | |



| UHF tag IC family overview – 840-960 MHz (UHF) | overvie | w-840- | HW 096 | z (UHF) | | | | | | | | |
|--|----------------|----------------------------|----------------|-----------------|----------------|--------------------------------|----------------|--------------|---------------|----------------|---------------|---|
| Product features | UCODE® G2XL | UCODE® G2XM | UCODE® G2iL | UCODE® G2iL+ | UCODE® G2iM | UCODE® G2iM+ | UCODE® | UCODE® 7m | UCODE® 7xm | UCODE® 7xm+ | UCODE® I²C | UCODE® DNA® |
| RFInterface | | | | | | - 840 - | 840 - 960 MHz | | | | | |
| EPC global standard | 1.0.9 / 1.1.0 | 1.0.9 / 1.1.1 | 1.2.0 | 1.2.0 | 1.2.0 | 1.2.0 | 1.2.0 | 1.2.0 | 1.2.0 | 1.2.0 | 1.2.0 | GS1 Gen2 v2.0 ISO29167-10 ISO18000-63 |
| User memory [bit] | | 512 | | | 512 | upp to 640 dep. on EPC size | | 32 | 1024 | 2048 | 3328 | 3072 |
| EPC code size [bit] | 240 | 240 | 128 | 128 | 726 | 256-448 | 128 | 128 | 448 | 448 | 160 | 224 |
| TID size[bit) | 64 | 64 | 64 | 64 | 96 | 96 | 96 | 96 | 96 | 96 | 96 | 96 |
| Access password [bit] | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| Kill password [bit) | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 | 32 |
| User password | | | | | | 32 | | | | | | 1 |
| Data retention [Years] | 20 | 20 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 20 | 20 |
| Write endurance [cycles] | 100.000 | 100.000 | 10 000 | 10 000 | 10000 | 10 000 | 100.000 | 100.000 | 100.000 | 100.000 | 50000 | 100.000 |
| Feature set | | | | | | | | | | | | |
| Read protection (bankwise) | ^ | ^ | > | > | > | > | > | > | ^ | ^ | > | > |
| Block perma lock | - | ^ | | | > | > | 1 | | ^ | ^ | | > |
| Tag authenticaten | - | - | - | - | | | - | - | - | - | - | AES - 128 Bit |
| Privacy protection | - | | | - | | | 1 | | - | | | ` |
| Block write | - | - | ^ | 1 | ^ | ^ | ^ | ^ | 1 | ^ | ~ | ^ |
| Segmented user memory | | | | | | ` | | | | | | ` |
| PSF (Product Status Flag- EAS) | ^ | ^ | ^ | 1 | ^ | ^ | ^ | ^ | ^ | ^ | ^ | ` |
| Automatic self pre-serialization | , | | , | | | , | > | > | > | > | | > |
| Parallel encoding | | | | | | | ` | ` | ^ | ` | | > |
| Tag power indicator | | | , | | , | , | ` | ` | ` | ` | , | ` |
| Tagtamperalarm | - | - | - | 1 | - | ^ | - | - | - | - | - | - |
| Digital switch | - | | | ^ | | ^ | - | | - | - | ^ | - |
| External supply mode | - | | | > | | > | | | | | > | 1 |
| Backscatter strength reduction | - | - | ^ | 1 | | ^ | ^ | ^ | ^ | ^ | ~ | ` |
| Real read range reduction (4R) | - | | ^ | 1 | | ^ | | | - | | ^ | ` |
| Digital signature [bit] | | | | | | | | | | ` | | , |
| Untraceable | | | , | , | , | | , | | > | > | , | > |
| Data transfer | , | | , | > | | ` | , | , | | | > | , |
| Bridge mode for fast data transfer | | | | | | | | | | | ` | , |
| 2 UHF Front Ends | , | | , | | | , | , | , | | | ` | , |
| I ² C Interface | - | - | - | - | | | - | - | - | | ~ | 1 |
| Trust provisioning service | | | | | | | | | | | | > |
| Packages | | | | | | | | | | | | |
| Wafer FFC 150µm | SL3ICS1202UG | SL3ICS1202UG SL3ICS1002FUG | - | - | | - | | - | - | - | - | - |
| Wafer FCC 120µm | - | | SL3S1203FUD | SL3S1213FUD | SL3S1003FUD | SL3S1013FUD | SL3S1204FUD/BG | SL3S1214FUD | SL3S1004FUD | SL3S1014FUD | | SL3S5002N0FUD |
| S0T1122 | SL3S1202FTB1 | SL3S1002FTB1 | | | | | | | | | | , |
| 501886 | | | SL3S1203FTB0 | | | SL3S1013FTB0 | SL3S1204FTB0 | SL3S1214FTB0 | | | | 1 |
| S0T 902-3 (XQFN8) | | | | | | | | | | | SL3S4011FHK | ı |

For further details please refer to: www.nxp-rfid.com