



NXP® UCODE® DNA tag IC

A breakthrough in RAIN RFID security

Bringing security to passive UHF, the UCODE DNA tag IC combines exceptional long-range contactless performance with a cutting-edge cryptographic security implementation for tag authentication.

KEY FEATURES

- ▶ Designed in accordance with GS1™ UHF RFID Gen2 v2.0 [Annex N, Tag Alteration (Authenticate)]
- ▶ AES (Advanced Encryption Standard) cryptographic authentication according to ISO/IEC 29167-10
- ▶ Up to 3 KB of user memory with BlockPermalock
- ▶ 96-bit unique tag identifier (TID), factory-locked with 48-bit unique serial number
- ▶ Up to 448-bit EPC
- ▶ 32-bit kill password and 32-bit access password
- ▶ Innovative functionality
 - Tag authentication via 128-bit AES unique crypto key
 - Privacy protection via untraceable command and 128-bit AES group crypto key
 - Trust provisioning for secure secrets
- ▶ Compatible with 4-pads assembly
- ▶ READ sensitivity: -19 dBm
- ▶ AES authentication sensitivity: -18 dBm
- ▶ WRITE sensitivity: -11 dBm
- ▶ WRITE speed: 32 bits per 1.5 ms

TARGET APPLICATIONS

- ▶ Automatic vehicle identification (e.g. electronic toll collection, electronic vehicle registration)
- ▶ Visitor registration and location services (e.g. theme parks, large events)
- ▶ Visitor classification and pre-processing (e.g. border crossings, stadium entry points)
- ▶ Retail supply-chain management/brand protection (e.g. luxury goods, fashion)
- ▶ Asset tracking (e.g. high-value assets)
- ▶ Hands-free access (e.g. in public transport or corporate access, as an added functionality to current smart card technology)

KEY BENEFITS

- ▶ Tag authentication and privacy protection based on cryptographic security
- ▶ Long read/write ranges due to excellent chip sensitivity
- ▶ Hassle-free deployment even without significant security know-how or secure backend infrastructure, due to NXP's Trust Provisioning service
- ▶ High sensitivity enables smaller and cost-efficient antenna designs
- ▶ Large RF pad-to-pad distance to ease antenna design
- ▶ Single slit antenna for a more mechanically stable antenna connection
- ▶ Pre-serialization of the 96-bit EPC



As the leader in RAIN RFID and secure authentication, NXP brings unique features to the UCODE DNA tag IC. Along with the expected features of GS1 UHF RFID Gen2 v2.0 as well as top-notch RF performance, NXP includes unexpected functionality, including a large user memory, BlockPermalock functionality and advanced privacy protection. On top of all this, NXP adds revolutionary security features, such as two 128-bit AES keys and an AES digital core for cryptographic authentication.

UCODE DNA implements all the mandatory commands of GS1 UHF RFID Gen2 v2.0, along with the following optional commands: Access, Authenticate, BlockPermalock, BlockWrite, ReadBuffer, and Untraceable.

AES AUTHENTICATION AND PRIVACY

UCODE DNA supports up to two 128-bit AES authentication keys. They are stored in the tag IC's securely guarded internal memory, and can be pre-programmed and locked by NXP or inserted by the user. These cryptographic keys can be used for tag authentication or for privacy protection.

TRUST PROVISIONING

To simplify development while strengthening the security of end applications, NXP offers a Trust Provisioning service which results in a UCODE DNA product that is ready to use as shipped.

NXP's unique service includes generating master passwords for Kill and Access, deriving individual Kill and Access passwords for each tag, and inserting these passwords into the tag. NXP also generates AES master keys, deriving all unique and tag-specific keys and then inserting them into the tag.

FEATURES

Standard Gen2	Serial TID (96 B) EPC (up to 448 B) Kill and access PWs (32 B each)
Superior RF performance	15 m range on license plate 10 m range on windshield label
Large user memory	up to 3 KB with BlockPermalock
Advanced functionality	Secure privacy protection
Cryptographic authentication	2 x 128 B AES keys AES digital core

ORDERING INFORMATION UCODE DNA

Product	Delivery Form	Type
UCODE DNA	Bumped die on sawn 8" 120 µm wafer with 7 µm polyimide layer	SL3S5002N0FUD/00BG1

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