

P304/P308/P310G002 family

Smart eID

Rev. 01 — 29 July 2008

Product short data sheet

1. General description

1.1 Smart eID family approach

The Smart eID family members feature a modular set of devices with:

- 4 KB to 10 KB EEPROM
- Secured triple-DES coprocessor
- ISO/IEC 14443 type A Contactless Interface Unit (CIU)
- EEPROM with minimum 100 000 cycles endurance and minimum 20 years retention time
- Pre-installed applications compliant to ICAO document 9303
- Command set compliant to ISO/IEC 7816-4
- Compliant to ISO/IEC 18013-3 (using BAP in configuration 1)

1.2 Smart eID family properties

Smart eID is designed to complement general-purpose smart card controllers in the NXP Semiconductors range of identification products for eGovernment applications. It is an “all-in” functionality product supporting ISO/IEC 7816 data structures, including those defined in ICAO document 9303. Smart eID is designed for low-end configurations in identification cards, driving licences or other eGovernment applications. The learning curve for implementers is quick, as the product is based on well-known standards. By using Smart eID, applications can be developed and validated within days. The Smart eID family can be regarded as low-end products due to their limited memory size. Triple-DES symmetric cryptography and the ISO/IEC 14443 type A contactless interface are supported.

The file system allows the creation of pre-configured applications that provide data groups within the application. Access to these data groups can be according to one of three modes: completely open (“LDS” – according to the Logical Data Structure defined in ICAO document 9303), protected with Basic Access Control and Secure Messaging (“BAC” – as defined in ICAO document 9303). A third configuration provides an additional mechanism to update data groups after issuing the electronic document to the holder as well as a feature to protect against cloning. These additional features make Smart eID particularly useful for ID cards, driving licences, and other eGovernment applications.

Compliance to existing MRTD (Machine Readable Travel Document) inspection equipment can be obtained by configuration settings according to ICAO document 9303. For driving licence applications, it can be configured to comply with ISO/IEC 18013-3, using BAP (Basic Access Protocol) security in configuration 1.



1.3 Naming convention

Table 1. Naming convention

P3xxG002zz Smart eID platform	
xx	amount of non-volatile memory in KB, increasing count for further product options
zz	package type

1.4 Architecture overview

Every member of the Smart eID product family consists of hardware and software components. The overall deliverable is a module for integration into a contactless smart card or other contactless device. This module comes pre-configured with application software and is ready to be personalized by NXP Semiconductors direct or indirect customers.

1.4.1 Hardware platform

Every member of the Smart eID product family uses a proven, NXP-developed smart card processor as the physical basis for its implementation. Chips are packaged in standard modules ready to be bonded to an antenna coil and embedded in contactless cards.

NXP Semiconductors reserves the right to change aspects of manufacturing technology, including, but not limited to: silicon chip design, silicon die size, choice of silicon technology, silicon chip packaging. All aspects of the hardware platform relevant to NXP Semiconductors direct or indirect customers are documented in the full data sheet and other documents available for the Smart eID product family and its individual members.

2. Features

2.1 Standard family features

- EEPROM: choice of 4 KB, 8 KB, 10 KB
 - ◆ Data retention time: 20 years minimum
 - ◆ Endurance: 100 000 cycles minimum
- ISO/IEC 7816 LDS-compatible file system implementation supporting open access, BAC and BAC plus operating modes
- Configurable authentication and security settings to match customer system requirements
- Configurable access conditions for elementary files
- Possible activation of the UPDATE BINARY command in BAC plus operating mode
- Life cycle management system
- ISO/IEC 7816-4 compliant subset of the commands for file manipulation
- Proprietary commands for easier personalization and transport key exchange
- Flexible support for one fixed functionality ID capable application
- Flexible file system based on ICAO LDS structure

2.2 Product-specific family features

- P304G002 and P308G002:
 - ◆ 7-byte unique identifier (cascade level two according to ISO/IEC 14443-3)
- P310G002:
 - ◆ 4-byte unique identifier
 - ◆ With MIFARE 4 KB emulation

2.3 Security features

- Support for ICAO BAC and ISO/IEC 8013-3 in BAP configuration 1
- Self-securing file system
- Data encryption on RF channel with replay attack protection
- Hardware DES using 112-bit keys, featuring key version
- Data authenticity by 8 bytes CMAC
- Authentication on application level
- Hardware exception sensors

2.4 RF interface: ISO/IEC 14443 type A

- Contactless transmission of data and powered by the RF field (no battery needed)
- Operating distance: up to 100 mm (depending on antenna geometry)
- Operating frequency: 13.56 MHz
- Fast data transfer: 106 kbit/s, 212 kbit/s, 424 kbit/s
- High data integrity: 16-bit CRC, parity, bit coding, bit counting; CMAC; MAC
- True deterministic anticollision mechanism
- Compliant to ISO/IEC 14443-4 type A protocol

2.5 Supported command set

- SELECT FILE
- READ BINARY
- UPDATE BINARY
- GET CHALLENGE
- MUTUAL AUTHENTICATE
- GET DATA
- INTERNAL AUTHENTICATE
- CREATE FILE
- ACTIVATE FILE
- LOAD IMAGE (proprietary)
- VERIFY IMAGE (proprietary)

3. Applications

- Driving licence
- eGovernment
- National identity card
- Corporate card
- Vehicle registration sticker

4. Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
C _{iss}	input capacitance	measured on pads LA and LB; test frequency at 17.4 MHz; T _{amb} = 25 °C; V _{DD} = 0 V	-	13.5	-	pF
f _{oper}	operating frequency	measured on pads LA and LB; T _{amb} = 25 °C	-	13.56	-	MHz

5. Ordering information

Table 3. Ordering information

Type number	Package ^[1]		
	Name	Description	Version
P304G002A4	PLLMC ^[2]	plastic leadless module carrier package; 35 mm wide tape	SOT500-2
P308G002A4			
P310G002A4			

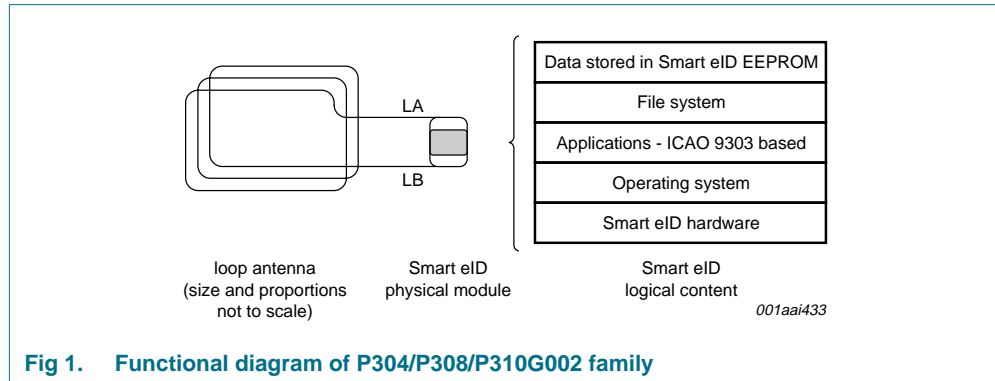
[1] For further package options, please contact your local NXP sales representative or to the NXP Semiconductors sales department. To obtain NXP Semiconductors sales office addresses, please e-mail salesaddresses@nxp.com.

[2] This package is also known as MOB4.

Table 4. Product types and features

Product type	EEPROM (KB)	MIFARE 4 KB emulation	Coprocessor		ISO/IEC 7816 IO pads	Interface option
			DES	AES		
P304G002	4	no	yes	no	2	contactless interface
P308G002	8	no	yes	no	2	contactless interface
P310G002	10	yes	yes	no	2	contactless interface

6. Functional diagram



7. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to V_{SS} (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit	
V_{esd}	electrostatic discharge voltage	pads VDD, VSS, CLK, RST_N, IO1, IO2, IO3	[1]	-	±4.0	kV
		pads LA, LB	[1]	-	±2.0	kV
P_{tot}	total power dissipation		[2]	-	1	W
T_{stg}	storage temperature		[3]	-	-	°C

[1] MIL Standard 883-D method 3015; human body model; C = 100 pF, R = 1.5 kΩ; $T_{amb} = -25\text{ °C}$ to $+85\text{ °C}$.

[2] Depending on appropriate thermal resistance of the package.

[3] Depending on delivery type, refer to NXP Semiconductors *General Specification for 8 inch Wafers* and to NXP Semiconductors *Contact & Dual Interface Chip Card Module Specification*.

8. Abbreviations

Table 6. Abbreviations

Acronym	Description
AES	Advanced Encryption Standard
BAC	Basic Access Control
BAP	Basic Access Protocol
CMAC	Cryptographic MAC
CRC	Cyclic Redundancy Check
DES	Data Encryption Standard
eID	electronic Identity Document
EEPROM	Electrically Erasable Programmable Read-Only Memory
FFC	Film Frame Carrier
ICAO	International Civil Aviation Organization
IEC	International Electrotechnical Commission
IO	Input Output
ISO	International Standardization Organization
KB	1024 bytes
LDS	Logical Data Structure
MAC	Message Authentication Code
RF	Radio Frequency

9. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
P304_P308_P310G002_FAM_SDS_1	20080729	Product short data sheet	-	-

10. Legal information

10.1 Data sheet status

Document status ^{[1][2]}	Product status ^[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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