



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

MIFARE® contactless tag IC family overview

Product features	MIFARE Ultralight*				MIFARE Classic*		MIFARE Plus*				MIFARE DESFire*									
	Nano	EV1	C	EV1	SE	X	EV1		Light	EV1			EV2							
RF Interface	ISO/IEC 14443-2, Type A 13.56 MHz																			
Protocol	ISO/IEC 14443-3					ISO/IEC 14443-3&4					ISO/IEC 14443-4									
UID - unique identifier	7-byte UID				7-byte UID, 4-byte NUID, Random ID				7-byte UID, Random ID											
Communication speed	106 Kbps								106-848 Kbps											
Memory size [Bytes]	40	48	128	144	1K	4K	1K	2K	4K	2K	4K	640	2K	4K	8K	2K	4K	8K	16K	32K
Memory model	Compact, 4-byte pages				Compact, sectors & 16-byte blocks				Pre-configured file system		Flexible file system									
Crypto	-			3KDES	Crypto-1		Crypto-1, AES				AES/LRP		DES/2K3DES/3K3DES/AES							
Key length	-			112-bit	48-bit		48-bit Crypto-1, 128-bit AES				128-bit AES		128-bit AES, up to 168-bit DES							
Authentication	-			Password	-		-				3-pass mutual		-							
Communication security	-				Encrypted		Plain, CMACed, encrypted w. CMAC				-		Plain, CMACed, encrypted w. CMAC							
MisSmartApp	-				-		-				-		-							
Transaction MAC	-				-		-				-		-							
Multi key sets	-				-		-				-		-							
Proximity check	-				-		-				-		-							
Virtual card select	-				-		-				-		-							
Originality check features	ECC signature programmable	ECC signature		-	ECC signature	-	AES originality keys		AES originality keys, ECC signature		-		AES originality keys, ECC signature							
CC Certification	-				-		-				-		-							
ISO 7816-4 APDU	-				-		-				-		-							
NFC compliance	NFC Forum type 2 tag compliant				Not supported by majority of NFC devices		NFC capable in SL3		NFC capable in SL1 and SL3		NFC Forum type 4 tag V2.0 compliant									
Target applications	Public transport & event ticketing loyalty programs, limited use tickets				Single application - not recommended for new design		Public transport/ campus cards/ access management				Smart city platform/ advanced mobility multi-applications/ micropayment/ loyalty programs/ access management									
Input capacitance [pF]	17/50				17		17/70		17		17/50		17/70							
Multi applications	-				Supported via MAD		Supported via MAD				Fixed, single application		Dynamic							

* MIFARE Ultralight EV1 and MIFARE Classic EV1 wafer deliveries are next to 8 inch as well available on 12 inch

MIFARE and NFC reader/writer IC solutions selection

Product	NFC frontend solutions				NFC controller solutions		HITAG
	SLRC610	MFR630	CLRC663	PN5180	PN7150	PN7462	HTRC110
Integrated microcontroller	High-performance ISO/IEC 15693 ICODE				Full NFC Forum-compliant controller with integrated FW and NCI interface		Highly integrated optimized HITAG short range reader/writer
Carrier frequency [MHz]	-				13.56		0.125
Standards & protocols							
Reader/writer	ISO/IEC 15693 ISO/IEC 18000-3M3	ISO/IEC 14443 A	ISO/IEC 18092 ISO/IEC 14443 ISO/IEC 15693 ISO/IEC 18000-3M3 Felica	ISO/IEC 18092 ISO/IEC 14443 ISO/IEC 15693 ISO/IEC 18000-3M3 Felica	ISO/IEC 18092 ISO/IEC 14443 ISO/IEC 15693 Felica	ISO/IEC 18092 ISO/IEC 14443 ISO/IEC 15693 Felica	HITAG
NFC tag type reader	5	1, 2, 4	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5	1, 2, 3, 4, 5	-
ISO/IEC 14443 Bit-rate [KBit/s]	-				106/212/424/848		-
Felica Bit-rate [KBit/s]	-				212/424		-
MIFARE Classic support (license included)	-				-		-
ISO/IEC 15693 Bit-rate [KBit/s]	26.5/53	-	26.5/53	26.5/53	26.5	26.5/53	-
EMVCo compliance	-				-		-
Card emulation	-				-		-
NFC tag type emulation	-				4A		4A
NFC tag type Bit-rate [KBit/s]	-				106/212/424/848		106/212/424/848
Peer-to-peer (ISO/IEC 18092)	-				-		-
Passive communication	-				Initiator/Target		Initiator/Target
Active communication	-				Initiator/Target		Initiator/Target
Security features							
MIFARE SAM support	-				-		via UART ISO 7816
MIFARE Classic security (CRYPTO1 HW)	-				-		-
Product support & ordering information							
Package	HVQFN32	HVQFN32	HVQFN32	HVQFN40 TFBGA64	HVQFN40	HVQFN64	S014
Product type	SLRC61002HN	MFR63002HN	CLRC66302HN	PN5180A0HN	PN7150B0HN	PN7462A0HN	HTRC11001T/02EE
Software	-				-		-
NFC Reader library	-				-		-

For further details please refer to www.nxp.com/products/identification-and-security/reader-ics:READERS-ICS

MIFARE embedded card functionality on SmartMX®

Product	MIFARE implementations							Features						
	Available card IC functionality							UID options			Parameters	Exit on	MIFARE select	
	MIFARE Classic 1K	MIFARE Classic 4K	MIFARE Plus X 2K	MIFARE Plus X 4K	MIFARE DESFire EV1 2K	MIFARE DESFire EV1 4K	MIFARE DESFire EV1 8K	7 Byte UID	4 Byte NUID	4 Byte Random ID	ATQA, SAK, ATS	incomplete SAK	Time out UART RF-Field	
P5Cx145 CD128Cx081 CD051 CD041 CD021/CD016	✓	✓	-	-	-	-	-	✓	✓	✓	ATQA, SAK, ATS	-	✓	N/A
P5Cx081V1D/CD041V1D CD021V1D CD016V1D	-	-	-	-	✓	✓	✓	✓	-	-	ATS	-	-	N/A
P5Cx144 Cx080/CD040 CD020/CD012	✓	✓	-	-	-	-	-	✓	-	-	ATQA, SAK, ATS	-	✓	N/A
P5Cx145 CD128 P60D144M P60D080M P60D024M P60D144D P60D080D P60D024D P60N144J P60D144J P60D080J	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	ATQA, SAK, ATS	✓	✓	✓



MIFARE – SAM (Secure Access Modules)

Product features	MIFARE SAM	
	AV2	AV3
Communication interface	ISO/IEC 7816, Class A, B T=1, up to 1.5 Mbps I2C interface to MFRCS2X, PMS1X, CLRC66x	Host Interface: ISO/IEC 7816, Class A, B and C, T=1, up to 1.5 Mbps Optional I2C slave Standard and Fast Mode (HVQFN32 only) X-Mode Interface: MFRCS2x, PMS1x and CLRC66x
Cryptographic algorithms	TDEA 112-bit and 168-bit key MIFARE Crypto-1 AES-128 and AES-192 RSA-up to 2048-bit key	TDEA 112-bit and 168-bit key MIFARE Crypto-1 AES-128, AES-192 and AES-256 RSA up to 2048-bit key, ECDSA up to 256-bit key
Public key infrastructure (PKI)	✓	✓
Hash function	SHA-1, SHA-224 and SHA-256	SHA-1, SHA-224 and SHA-256
Supported cryptography	MIFARE Classic, MIFARE Ultralight C, MIFARE Plus MIFARE DESFire, MIFARE DESFire EV1	MIFARE Classic, MIFARE Ultralight, MIFARE Plus (up to EV1), MIFARE DESFire (up to EV2), NTAG DNA, ICODE DNA, UCODE DNA
Secure host communication	✓	✓
X-functionalities	✓	✓
Unique serial number [Bytes]	7	7
True random number generator	✓	✓
No of symmetric key entry	128 (3 keys per key entry)	128 (3 keys per key entry)
No of RSA key entry	2.5 pair	2 key pairs, 1 public key
No of ECC key and curve entry	-	8 keys, 4 curves
No of EMV key entry and RID	-	24 keys, 4 RIDs
Access conditions	per entry	per entry
Key usages counter	16	16
Key diversification	Encryption based, CMAC based	Encryption based, CMAC based
RSA	Signature, Encryption for updating symmetric key entry	MACing/ Encipherment/ Signature
ECC	-	Signature
DES/3DES security	MACing/ Encipherment	MACing/ Encipherment
AES 128 security	MACing/ Encipherment	MACing/ Encipherment
Programmable Logic	-	✓

Delivery types	MIFARE SAM AV3		MIFARE SAM AV2	
	PCM1.5	HQDR32	PCM1.1	HQDR32
Contact module	-	-	-	-
HQDRN	-	-	-	-
PartType	-	-	-	-

Development and testing tools

Products	Short description	Supported NXP platforms
NXP Originality 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 RFID Discover tool	MIFARE NTAG ICODE
RFID Discover (Windows)	Allows easy access to the commands of any NXP 13.56Mhz contactless IC with the click of a button	MIFARE NTAG ICODE
TapLinx	Facilitates App Development by providing a JAVA API for MIFARE, NTAG, ICODE families	MIFARE NTAG ICODE

