ISO 7816 ISO 14443

NXP MIFARE™ Smart Card ICs

Product Features	MIFARE Ultralight™	MIFARE Ultralight™ C	MIFARE™ Classic 1K	MIFARE™ Classic 4K	MIFARE Plus™ S 2K	MIFARE Plus™ S 4K	MIFARE Plus™ X 2K	MIFARE Plus™ X 4K	MIFARE DESFire™ EV1 2K	MIFARE DESFire™ EV1 4K	MIFARE DESFire™ EV1 8K
	MF0 IC U1X	MF0 IC U2X	MF1 S50	MF1 S70	MF1 SPLUS 60	MF1 SPLUS 80	MF1 PLUS 60	MF1 PLUS 80	MF3 IC D21	MF3 IC D41	MF3 IC D81
Memory											
EEPROM size [byte]	64	192	1024	4096	2048	4096	4096	4096	2048	4096	8192
OTP area [bit]	32	32	-	-	-	-	-	-	-	-	-
Write Endurance [cycles]	10 000	10 000	100 000	100 000	200 000	200 000	200 000	200 000	500 000	500 000	500 000
Data Retention [yrs]	5	5	10	10	10	10	10	10	10	10	10
Organization	16 pages à 4 byte	48 pages à 4 byte	16 sectors á 64 byte	32 sectors á 64 byte 8 sectors á 256 byte	32 sectors á 64 byte	32 sectors á 64 byte 8 sectors á 256 byte	32 sectors á 64 byte 8 sectors á 256 byte	32 sectors á 64 byte 8 sectors á 256 byte	flexible file system	flexible file system	flexible file system
RF-Interface											
Acc. to ISO 14443A	yes - up to layer 3	yes – up to layer 3	yes - up to layer 3	yes - up to layer 3	yes - up to layer 4	yes - up to layer 4	yes - up to layer 4	yes - up to layer 4	yes - up to layer 4	yes - up to layer 4	yes - up to layer 4
Frequency [MHz]	13.56	13.56	13.56	13.56	13.56	13.56	13.56	13.56	13.56	13.56	13.56
Baudrate [kbit/s]	106	106	106	106	106 … 848	106 … 848	106 … 848	106 … 848	106 … 848	106 … 848	106 … 848
Anticollision	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise
Operating Distance [mm]	up to 100	up to 100	up to 100	up to 100	up to 100	up to 100	up to 100	up to 100	up to 100	up to 100	up to 100
Security											
Serial Number [byte]	7 B UID	7 B UID	4 B NUID or 7 B UID with optional random ID#	4 B NUID or 7 B UID with optional random ID#	4 B NUID or 7 B UID, optional random ID	4 B NUID or 7 B UID, optional random ID	4 B NUID or 7 B UID, optional random ID	4 B NUID or 7 B UID, optional random ID	7 B UID	7 B UID	7 B UID
Random Number Generator	-	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Access Keys	-	1 key	2 keys per sector	2 keys per sector	2 CRYPTO1 or AES keys per sector	2 CRYPTO1 or AES keys per sector	2 CRYPTO1 or AES keys per sector	2 CRYPTO1 or AES keys per sector	14 keys per application	14 keys per application	14 keys per application
Access Conditions	per page	per page	per sector	per sector	per sector	per sector	per sector	per sector	per file	per file	per file
MIFARE Classic™ Security (Crypto1)	-	-	supported	supported	supported in security level 1&2	supported in security level 1&2	supported in security level 1&2	supported in security level 1&2	-	-	-
DES & DES3 Security	-	authentication	-	-	-	-	-	-	CMACing / Encipherment	CMACing / Encipherment	CMACing / Encipherment
AES 128 Security	-	-	-	-	CMACing	CMACing	CMACing / Encipherment	CMACing / Encipherment	CMACing / Encipherment	CMACing / Encipherment	CMACing / Encipherment
Anti-tear supported by chip	-	-	for value blocks	for value blocks	for AES keys, sector trailers and configuration	for AES keys, sector trailers and configuration	for AES keys, sector trailers and configuration	for AES keys, sector trailers and configuration	yes	yes	yes
Special Features											
Multi-application	-	-	supports MAD*	supports MAD2**	supports MAD2**	supports MAD2**	supports MAD2**	supports MAD2**	28 applications, MAD3***	28 applications, MAD3***	28 applications, MAD3***
Special Functionalities	-	-	-	-	Multi-sector authentication	Multi-sector authentication	Multi-sector authentication, Proximity Check, full virtual card support	Multi-sector authentication, Proximity Check, full virtual card support	Automatic backup mechanism Random ID (optional)	Automatic backup mechanism Random ID (optional)	Automatic backup mechanism Random ID (optional)
Purse Functionality	-	16-bit counter	Value block format	Value block format	-	-	Value block format	Value block format	Value file	Value file	Value file
Packaging											
Sawn Wafer	-	-	4 B NUID MF1S5035DUH	4 B NUID MF1S7035DUB	-	-	-	-	-	-	-
Sawn Wafer (Au-Bumped)	MF0ICU1001W/S7DL (17 pF, 75 µm) MF0ICU1101W/S7DL (50 pF, 75 µm) MF0ICU1001W/U7DL (17 pF, 120 µm) MF0ICU1101W/U7DL (50 pF, 120 µm)	MF0ICU2001DUD (17 pF) MF0ICU2101DUD (50 pF)	7 B UID MF1S500yXDUD## 4 B NUID MF1S503y(X)DUD#	7 B UID MF1S700yXDUD## 4 B NUID MF1S703y(X)DUD#	7 B UID MF1SPLUS6001DUD/03 4 B NUID MF1SPLUS6031DUD/03	7 B UID MF1SPLUS8001DUD/03 4 B NUID MF1SPLUS8031DUD/03	7 B UID MF1PLUS6001DUD/03 4 B NUID MF1PLUS6031DUD/03	7 B UID MF1PLUS8001DUD/03 4 B NUID MF1PLUS8031DUD/03	MF3ICD2101DUD/05 (17 pF) MF3ICDH2101DUD/05 (70 pF)	MF3ICD4101DUD/05 (17 pF) MF3ICDH4101DUD/05 (70 pF)	MF3ICD8101DUD/05 (17 pF) MF3ICDH8101DUD/05 (70 pF)
MOA2 Module	-	-	4 B NUID MF1S5030DA3	4 B NUID MF1S7030DA3	-				-	-	-
MOA4 Module	MF0MOA4U10/D	MF0MOU2001DA4 (17 pF) MF0MOU2101DA4 (50 pF)	7 B UID MF1S5000XDA4# 4 B NUID MF1S5030(X)DA4#	7 B UID MF1S7000XDA4# 4 B NUID MF1S7030(X)DA4#	7 B UID MF1SPLUS6001DA4/03 4 B NUID MF1SPLUS6031DA4/03	7 B UID MF1SPLUS8001DA4/03 4 B NUID MF1SPLUS8031DA4/03	7 B UID MF1PLUS6001DA4/03 4 B NUID MF1PLUS6031DA4/03	7 B UID MF1PLUS8001DA4/03 4 B NUID MF1PLUS8031DA4/03	MF3MOD2101DA4/05 (17 pF) MF3MODH2101DA4/05 (70 pF)	MF3MOD4101DA4/05 (17 pF) MF3MODH4101DA4/05 (70 pF)	MF3MOD8101DA4/05 (17 pF) MF3MODH8101DA4/05 (70 pF)
MOA8 Module			7 B UID MF1S5000XDA8# 4 B NUID MF1S5030(X)DA8#	7 B UID MF1S7000XDA8# 4 B NUID MF1S7030XDA8#							

*MAD: MIFARE Application Directory **MAD2: MAD Extension for 4 kbyte EEPROM size ***MAD3: MAD2 Extension for DESFire
Available from Q1 2011 onwards/X-Types available from Q2 2011 onwards ## «y» indicating the silicon source

ICs with DPA Countermeasures functionality

NXP ICs containing functionality implementing countermeasures to Differential Power Analysis and Simple Power Analysis are produced and sold under applicable license from Cryptography Research, Inc.

Specification subject to change without notice.

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