For further details, please check out:
www.nxp.com/identification
or e-mail info.bli@nxp.com

NXP Contactless Reader Systems

	Reader ICs								Evaluation kits		
Product Features	**MF RC500**	**MF RC530**	**MF RC531**	**CL RC632**	**SL RC400**	**MF RC522**	**MF RC523**	**CL RC663**	**CL RD701**	**MF EV710**	**MF EV852**
Operating distance up to [mm] (1)	100	100	100	100 / 150 (3)	150	70	70	120	100 / 150 (3)	100 (4)	100 (4)
FIFO depth [byte]	64	64	64	64	64	64	64	512	64	64	64
Host interface	8-bit parallel	8-bit parallel	SPI 8-bit parallel	SPI 8-bit parallel	SPI 8-bit parallel	SPI I^2C RS232	SPI I^2C RS232	SPI 2x I^2C RS232	USB	USB; Ethernet, Jtag (with additional connection board)	USB; Ethernet, JTag (with additional connection board)
RF Interface											
Analog interface	fully integrated	fully integrated	fully integrated	fully integrated	fully integrated	fully integrated	fully integrated	fully integrated	CLRC632	RC523	RX852
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
Modulation	100% ASK	100% ASK	10% & 100% ASK	10% & 100% ASK	10% & 100% ASK	100% ASK	10% & 100% ASK	10% & 100% ASK	10% & 100% ASK	10% & 100% ASK	10% & 100% ASK
Baudrate ISO 14443 [kbit/s]	106	106/212/424	106/212/424	106/212/424		106/212/424/848	106/212/424/848	106/212/424/848	106/212/424	106/212/424/848	106/212/424/848
Baudrate ISO 15693 [kbit/s]	-	-	-	1.66/26.5/53	1.66/26.5/53	-	-	1.66/26.5/53	1.66/26.5/53	-	-
Standards & Protocols											
NFC Tag Type Reader	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
ISO 14443 A	yes	yes	yes	yes	-	yes	yes	yes	yes	yes	yes
ISO 14443 B	-	-	yes	yes	-	-	yes	yes	yes	yes	yes
ISO 15693	-	-	-	yes	yes	-	-	yes	yes	-	-
MIFARE Classic support	yes	yes	yes	yes		yes	yes	yes	yes	yes	yes
ICODE 1 protocol	-	-	-	yes	yes	-	-	yes	yes	-	-
HF EPC protocol	-	-	-	yes	yes	-	-	yes	yes	-	-
ISO 18092 (NFC)	-	-	-	-	-	-	-	yes (2)	-	-	-
Security Features											
MIFARE Classic	yes	yes	yes	yes	-	yes	yes	yes	yes	yes	yes
Additional Product Information											
Supply voltage digital [V]	5	3.3 or 5	3.3 or 5	3.3 or 5	5	3.3	3.3	3.3…5	5	5	5
Supply voltage analog [V]	5	5	5	5	5	3.3	3.3	3.3…5	-	-	-
Power down mode current, typ. [µA]	2	2	2	2	2	1	1	1	n.a.	n.a.	n.a.
Temperature range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	0/+70	0/+70	0/+70
Package	SO32	SO32	SO32	SO32	SO32	HVQFN32	HVQFN32	HVQFN32	-	-	-
Approvals											
EMC	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	CE, FCC	CE, FCC	CE, FCC

(1) Depending on antenna, coil size, tuning, and environment (2) Only passive mode initiator support (3) For ISO15693 (4) With external booster
MIFARE and FeliCa are registered trademarks of NXP Semiconductors and Sony Cooperation.

NXP Contact Smart Card Reader ICs

	Analog Interface							Analog & UART	Analog & UART & CPU
Product Features	**TDA8020**	**TDA8023**	**TDA8024**	**TDA8025**	**TDA8026**	**TDA8034**	**TDA8035**	**TDA8007B**	**TDA8029**
Analog interfaces	2	1	1	1	5	1	1	2	1
ISO 7816 UART	no	no	no	no	no	no	no	yes	yes
ISO 7816 dedicated timers	no	no	no	no	no	no	no	yes	yes
µC-core	-	-	-	-	no	-	-	no	80C51RB+
ROM[kbyte] / RAM[byte]	-	-	-	-	-	-	-		16/768
Flexible sequencer programmation	no	yes	no	no	yes	no	no	no	no
Host interface	I^2C	I^2C	I/O lines	I/O lines	I^2C	I/O lines	I/O lines	8 bit parallel	serial or I^2C
ESD protection on ISO pads [kV]	6	6	6	6	7	6	8	6	6
Auxiliary protected lines for C4 and C8 contacts	0	2	2	2	2 (on slot 1)	2	2	2x2	0
Vcc card power supply [V]	3 & 5	1.8 & 3 & 5	3 & 5	1.2 & 1.8 & 3	1.8 & 3 & 5	1.8 & 3 & 5	1.8 & 3 & 5	1.8 & 3 & 5	1.8 & 3 & 5
Card supply current @ 5 V Vcc [mA]	2x55	55	80	-	55	65	65	55	65
Card supply current @ 3 V Vcc [mA]	2x50	55	65	65	55	65	65	55	50
Card supply current @ 1.8 V Vcc [mA]	-	35	-	65	35	65	35	35	30
Card supply voltage @1.2 V Vcc [mA]	-	-	-	30	-	-		-	-
Card clock frequency max. [MHz]	20	20	26	26	20	26	26	26	20
Card activation time max. [µs]	135	135	225	240	135	3500	3400	135	225
Card deactivation time max. [µs]	110	110	100	100	100	250	90	100	100
Protocol Support									
Synchronous card management	-	yes	-	-	yes	yes	yes	yes	yes
Asynchronous protocol T=0 and T=1	yes	yes	yes	yes	yes	yes	yes	yes	yes
Security Features									
Voltage supervisor and over current detection	yes	yes	yes	yes	yes	yes	yes	yes	yes
Current protection on VCC, I/O, RST, CLK	yes	yes	yes	yes	yes	yes	yes	yes	yes
Additional Product Information									
Power supply interface VDDI (V)	-	1.5 - 6.5	-	1.6 - 3.3	-	1.6 - 3.6	1.6 - 3.6	-	-
Power supply (V)	2.5 - 6.5	2.7 - 6.5	2.7 - 6.5	3.6 - 5.5	2.7 - 5.5	2.7 - 5.5	2.7 - 5.5	2.7 - 6.0	2.7 - 6.0
Power down current max (µA)	150	2	-	100	25	12	1	350	20
Temperature range (°C)	-25/85	-40/85	-40/85	-25/85	-25/85	-25/85	-25/85	-40/85	-25/85
Package	LQFP32	TSSOP28	SO28 & TSSOP28	HVQFN32	TFBGA64	HVQFN24 & SO16	HVQFN32	LQFP48	LQFP32
Software libraries (EMV 4.2)	-	-	-	-	-	-	-	yes	yes
NDS compliance	-	-	yes	yes	-	yes	yes	-	yes

NXP MIFARE™ SAMs for Reader Systems

Product Features	**MIFARE SAM AV1 MF3 IC D81 SAM**	**MIFARE SAM AV2**	**MF RX852**
Memory			
EEPROM size [byte]	72 K	81 K	72 K
OTP area [bit]	-		
Write Endurance [cycles]	100 000	100 000	100 000
Data Retention [yrs]	10	10	10
Secure key storage	up to 128 key entries	up to 128 key entries	up to 128 key entries
SAM-Interface			
UART	ISO 7816, T=1	ISO 7816, T=1	ISO 7816, T=1
Frequency [MHz]	1 … 10	1 … 10	1 … 10
Baudrate [kbit/s]	9.6 ... 1500	9.6 … 1500	9.6 ... 1500
Security			
Unique Serial Number [byte]	7	7	7
Random Number Generator	yes	yes	yes
Access Keys	128 key entries	128 key entries	128 key entries
Access Conditions	per key entry	per key entry	per key entry
MIFARE Classic Security	supported	supported	supported
DES & DES3 Security	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment
AES 128 Security	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment
PKI	-	Signature/Encipherment	-
RSA	-	Signature/Encipherment	-
Packaging			
PCM1.1 Module	P5DF072EV2/T0PD4090	P5DF081X0/T1AD2060S	-
HVQFN package	HVQFN32: P5DF072EHN/TOPD4090	HVQFN32: P5DF081HN/T1AD2060	HVQFN48

NXP HITAG™ Reader ICs

Product Features	**HTRC110 HITAG™ Reader ICs**
Modulation Type	100% ASK
Dimensions [mm]	6.2 x 8.75 x 1.45
Interface	CMOS
Supply Voltage [V]	5 ±10%
Antenna Driver Current [mA]	200 continuous
Clock Osc. Frequency [MHz]	4 … 16
Operating Temperature [°C]	-40 … +85
Power Down Current [µA typ.]	7
Supported Products	
HITAG™ 1	yes
HITAG™ 2	yes
HITAG™ S	yes
HITAG™ µ	yes
Security	
HITAG™ 1 data encryption	-
HITAG™ 2 data encryption	-
HITAG™ S data encryption	-
Package	
SO14, Tube	HTRC110 01T/02EE
SO14, Reel	HTRC110 01T/03EE

ISO 15693 ISO 18000 ISO 11784/85 EPCglobal

NXP Smart Label and Tag ICs

Product Features	**HITAG™ 1**	**HITAG™ 2**	**HITAG™ S**	**HITAG™ µ**	**HITAG™ µ Advanced HITAG™ µ Advanced+**	**HITAG™ µ ISO18000**	**HITAG™ RO64**	**ICODE SLI-S ICODE SLI-SY**	**ICODE SLI**	**ICODE SLI-L**	**ICODE SLIX**	**ICODE SLIX-S**	**ICODE SLIX-L**	**ICODE UID-OTP**	**ICODE UID**	**ICODE EPC**	**UCODE HSL**	**UCODE G2XL**	**UCODE G2XM**	**UCODE G2iL / G2iL+**
Total Memory																				
Size [bit]	2048	256	256, 2048	128	512, 1760	1760	64	2048	1024	512	1024	2048	512	192	192	136	2048	368	880	256
Write Endurance [cycles]	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	100 000	-	10 000	-	100 000	100 000	100 000	10 000
Data Retention [yrs]	10	10	10	10	10	10	10	10 / 40 (6)	10	10	50	50	50	5	5	5	10	50	50	20
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	55 blocks á 4 bytes	2 blocks á 4 bytes	16 pages each 4 blocks á 4 bytes	32 blocks á 4 bytes	4 pages each 4 blocks á 4 bytes	32 blocks á 4 bytes	16 pages each 4 blocks á 4 bytes	4 pages each 4 blocks á 4 bytes	24 blocks á 1 byte	24 blocks á 1 byte	17 blocks á 1 byte	64 blocks á 4 bytes	23 blocks á 2 bytes	55 blocks á 2 bytes	16 blocks á 2 bytes
RF-Interface																				
According to	HITAG 1	HITAG 2, ISO 11784/85	HITAG 1+, ISO 11784/85	ISO 11784/85 acc. HITAG µ	ISO 11784/85 acc. ISO14223	ISO18000	-	ISO 15693,ISO 18000, EPC (4)	ISO 15693, ISO 18000	ISO 15693, ISO 18000	ISO 15693, ISO 18000	ISO 15693, ISO 18000	ISO 15693, ISO 18000	EPC (4)	EPC (4)	EPC (4)	ISO18000-6B	EPC Class 1 Gen2	EPC Class 1 Gen2	EPC Class 1 Gen2
Frequency	100 … 150 kHz	100 … 150 kHz	100 … 150 kHz	100 … 150 kHz	100 … 150 kHz	100 … 150 kHz	100 … 150 kHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MH	UHF/2.4 GHz	840 - 960 MHz	840 - 960 MHz	840 - 960 MHz
Baudrate [kbit/s]	up to 4	up to 4	up to 8	up to 8	up to 8	up to 8	up to 8	up to 53	up to 53	up to 53	up to 53	up to 53	up to 53	up to 53	up to 53	up to 53	up to 40	up to 640	up to 640	up to 640
Anticollision	yes, collision detection	-	yes, collision detection	-	yes, collision detection	yes, collision detection	-	acc. ISO 15693, ISO 18000, EPC (4)	acc. ISO 15693, ISO 18000	acc. ISO 15693, ISO 18000	acc. ISO 15693, ISO 18000	acc. ISO 15693, ISO 18000	acc. ISO 15693, ISO 18000	acc. EPC (4)	acc. EPC (4)	acc. EPC (4)	binary tree	slotted ALOHA	slotted ALOHA	slotted ALOHA
Operating Distance [m]	up to 1.5	up to 1.5	up to 2.0	up to 2.0	up to 2.0	up to 2.0	up to 2.0	up to 2.0 (5)	up to 1.5	up to 2.0 (5)	up to 2.0 (5)	up to 2.0 (5)	up to 2.0 (5)	up to 1.5	up to 1.5	up to 1.5	up to 7	up to 10	up to 10	>10
Security																				
Unique Serial Number [byte]	4	4	4	6	6	6	5	8	8	8	8	8	8	5	5	-	8	TID:64 bit incl. 32 bit serial number	TID:64 bit incl. 32 bit serial number	TID:64 bit incl. 32 bit serial number
Write Protection	blockwise	blockwise	blockwise, multi user mode	blockwise	blockwise	blockwise	-	blockwise	blockwise	blockwise	blockwise	blockwise	blockwise	OTP	-	OTP	bytewise	bankwise	bankwise	bankwise
Access Keys	32-bit	48-bit	48-bit	32-bit	32-bit	32-bit	-	32-bit	-	-	-	32-bit	-	-	-	-	-	32-bit	32-bit	32-bit
Access Conditions	Encrypted Mutual Authentication or Plain	Encrypted Mutual Authentication or Plain	Authentication or Plain	Plain, Password	Plain, Password	Plain, Password	-	Plain, Password Pagewise configurable password protection read/write	-	-	-	Plain, Password Pagewise configurable password protection read/write	-	-	-	-	-	Plain, Read/Write Password	Plain, Read/Write Password	Plain, Read/Write Password
Encryption Algorithm	yes	yes	yes, for authentica-tion only	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Special Features																				
EAS	-	-	-	-	-	-	-	yes (Plain, Password)	yes	yes (Plain, Password)	yes (Plain, Password)	yes (Plain, Password)	yes (Plain, Password)	-	-	-	-	yes	yes	yes
AFI	-	-	-	-	-	-	-	yes	yes	yes	yes (Plain, Password)	yes (Plain, Password)	yes (Plain, Password)	-	-	-	yes	-	-	-
EPC	-	-	-	-	-	-	-	96 bit	-	-	-	-	-	96 bit	96 bit	96 bit	-	240 bit	240 bit	128 bit
User Memory [bit]	1792	128	192, 1984	128	512, 1760	1760		1280	896	256	896	1280	256	-	-	-	1728	-	512	-
TTF Modes	-	yes	yes	yes	yes	-	yes	-	-	-	-	-	-	-	-	-	-	-	-	-
Destroy Command	-	-	-	-	-	-	-	yes	-	yes	-	yes	yes	yes	yes	yes	-	yes	yes	yes
Privacy Command	-	-	-	-	-	-	-	yes	-	yes	-	yes	yes	-	-	-	-	Read Protect	Read Protect	Read Protect, Real Read Range Reduction (4R)
Others	RTF	RTF & TTF	RTF & TTF	RTF & TTF, Fast Write	RTF & TTF, Fast Write	RTF	TTF	fast inventory	fast inventory	fast inventory	fast inventory	fast inventory	fast inventory							Tag tamper alarm, digital switch, data transfer, battery assist mode
Packaging																				
Sawn Wafer	HT1ICS3002W/V9F	HT2ICS2002W/V9F	HTSICH5601EW/V1 HTSICH4801EW/V1	HTMS1001FUG/AM (1) HTMS8001FUG/AM (2)	HTMS1101FUG/AM (1) HTMS8101FUG/AM (2) HTMS1201FUG/AM (1) HTMS8201FUG/AM (2)	HTMS1301FUG/AM (1) HTMS8301FUG/AM (2)	HTCIC6402FUG/AM (1) HTCIC6403FUG/AM (2)	SL2 ICS5301EW/V7 SL2 ICS5401EW/V7 (3) SL2 ICS5311EW/V7 (6)	SL2 ICS2001DW/V1D	SL2 ICS5001EW/V7 SL2 ICS5101EW/V7 (3)	SL2 S2002FUD SL2 S2102FUD (3)	SL2 S5302FUD SL2 S5402FUD (3)	SL2 S5002FUD SL2 S5102FUD (3)	SL2 ICS1201DW/V1	SL2 ICS1101DW/V1	SL2 ICS1001DW/V1	SL3ICS3001FW/V4	SL3ICS1202FUG/V7AF	SL3ICS1202FUG/V7AF	SL3S1203FUF (G2iL) SL3S1213FUF (G2iL+)
Other Packages	MOA2	MOA2, SOT 385-1	FCP2, HVSON2, MOA2	HVSON2, SOT-1122	HVSON2, SOT-1122	HVSON2	-	FCP2, MOA2	FCP2, MOA2, FCS2-Al, FCS2-Cu	FCP2, MOA2	SOT-1122	-	SOT-1122	-	-	-	TSSOP8	FCS2-Al, FCS2-Cu, SOT1122, TSSOP8	FCS2-Al, FCS2-Cu, SOT1122, TSSOP8	FCS2-Al, FCS2-Cu, SOT886

(1) 210 pF ±3% (2) 280 pF ±5% (3) HC: high capacitance (97 pF) (4) HF EPC Class 1: EPCglobal/Auto-ID Center Specifcation (5) Based on ECC regulations (6) ICODE SLI-SY

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

LICENSED DPA COUNTERMEASURES™

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.

Date of Release: November 2010
Document order number: 9397 750 17001

All rights reserved. Reproduction in whole or in part is prohibited without prior written consent of the copyright owner.
© NXP Semiconductors N.V.

Z-CARD® PocketMedia® (trade marks used by Z Industries Ltd under licence.) This product is a doubly-folded sheet card. These products and associated machinery and processes are subject to European and Worldwide patents granted and pending, copyright, trade marks and other intellectual property rights including European patent numbers EP 602090 © 2009 Z Industries Ltd. Produced under licence by Z-CARD® LTD, London Tel +44 (0)207 924 5147. DDM, Herfstdreef 5, 2360 Oud-Turnhout Tel: 014 72 00 76 Fax: 014 45 37 32 belgium@zcard.com
Z-CARD www.zcard.com No. 27423/50

NXP_03_0188_Z_card_ Inside_Full_939775017001_v9.indd 1 10/11/10 16:51

NXP SmartMX
Secure Microcontrollers

Product Features	P5CD012	P5CD016	P5CD020	P5CD021	P5CD040	P5CD041	P5CN080
CPU	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51
ISO Contact Interface	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816
ISO Contactless Interface	ISO 14443	ISO 14443	ISO 14443	ISO 14443	ISO 14443	ISO 14443	-
NFC Interface type	-	-	-	-	-	-	S2C
ROM [byte]	200 K	264 K	200 K	264 K	200 K	264 K	200 K
RAM (linear addressable) [byte]	6 K	7.5 K	6 K	7.5 K	6 K	7.5 K	6 K
- Standard RAM [byte]	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K
- RAM accessible by FameXE [byte]	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K
EEPROM [byte]	12 K	16 K	20 K	20 K	40 K	40 K	80 K
Security Features							
PKI Crypto-Engine (FameXE)	yes	yes	yes	yes	yes	yes	yes
(RSA key length up to 8192-bit)	yes	yes	yes	yes	yes	yes	yes
RSA (1024 bit) signature generation (CRT)/verification, Exponent: 216+1	99 / 2 ms	71 / 2 ms	99 / 2 ms	71 / 2 ms	99 / 2 ms	71 / 2 ms	99 / 2 ms
ECC (192-bit signature) generation/ verification	32 / 60 ms	17 / 33 ms	32 / 60 ms	17 / 33 ms	32 / 60 ms	17 / 33 ms	32 / 60 ms
DES-Engine	DES3 < 40 us	DES3 <20 us	DES3 < 40 us	DES3 <20 us	DES3 < 40 us	DES3 <20 us	DES3 < 40 us
AES-Engine key length 128/192/256-bit	< 12/13/15 us	< 10/11/12 us	< 12/13/15 us	< 10/11/12 us	< 12/13/15 us	< 10/11/12 us	< 12/13/15 us
Exception Sensors	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light
Memory Management Unit (Firewall)	yes	yes	yes	yes	yes	yes	yes
Additional Product Information							
UART for implemented interfaces	yes	yes	yes	yes	yes	yes	yes
CRC-Engine	yes	yes	yes	yes	yes	yes	yes
Supply voltage [V]	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5
External Clock [MHz]	1 ... 10 (13,56)	1 ... 10 (13.56)	1 ... 10 (13,56)	1 ... 10 (13.56)	1 -... 10 (13,56)	1 ... 10 (13.56)	1 ... 10
Internal Clock [MHz]	1 ... 30	1 ... 62	1 ... 30	1 ... 62	1 - ... 30	1 ... 62	1 ... 30
Temperature range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85
EEPROM page mode granularity [byte]	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128
16-bit Timer/Counter	2	2	2	2	2	2	2
True Random Number Generator	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)
Technology	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm
MIFARE** emulation (option)	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K
Delivery Type Wafer	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)
Delivery Type Module	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	-
Evaluation and Certification							
3rd Party Hardware Evaluation	yes	yes	yes	yes	yes	yes	yes
Security Certificates*	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ EMVCo

Product Features	P5CD080	P5CN081	P5CD081	P5CD128	P5CN144	P5CD144	P5CD145
CPU	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51
ISO Contact Interface	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816
ISO Contactless Interface	ISO 14443	-	ISO 14443	ISO 14443	-	ISO 14443	ISO 14443
NFC Interface type	-	S2C	-	-	S2C	-	-
ROM [byte]	200 K	264 K	264 K	264 K	200 K	200 K	264 K
RAM (linear addressable) [byte]	6 K	7.5 K	7.5 K	7.5 K	6 K	6 K	7.5 K
- Standard RAM [byte]	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K
- RAM accessible by FameXE [byte]	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K
EEPROM [byte]	80 K	80 K	80 K	128 K	144 K	144 K	144 K
Security Features							
PKI Crypto-Engine (FameXE)	yes	yes	yes	yes	yes	yes	yes
(RSA key length up to 8192-bit)	yes	yes	yes	yes	yes	yes	yes
RSA (1024 bit) signature generation (CRT)/verification, Exponent: 216+1	99 / 2 ms	71 / 2 ms	71 / 2 ms	71 / 2 ms	99 / 2 ms	99 / 2 ms	71 / 2 ms
ECC (192-bit signature) generation/ verification	32 / 60 ms	17 / 33 ms	17 / 33 ms	17 / 33 ms	32 / 60 ms	32 / 60 ms	17 / 33 ms
DES-Engine	DES3 < 40 us	DES3 <20 us	DES3 <20 us	DES3 <20 us	DES3 < 40 us	DES3 < 40 us	DES3 <20 us
AES-Engine key length 128/192/256-bit	< 12/13/15 us	< 10/11/12 us	< 10/11/12 us	< 10/11/12 us	< 12/13/15 us	< 12/13/15 us	< 10/11/12 us
Exception Sensors	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light
Memory Management Unit (Firewall)	yes	yes	yes	yes	yes	yes	yes
Additional Product Information							
UART for implemented interfaces	yes	yes	yes	yes	yes	yes	yes
CRC-Engine	yes	yes	yes	yes	yes	yes	yes
Supply voltage [V]	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5
External Clock [MHz]	1 ... 10 (13.56)	1 ... 10	1 ... 10 (13,56)	1 ... 10 (13.56)	1 ... 10	1 ... 10 (13,56)	1 ... 10 (13.56)
Internal Clock [MHz]	1 ... 62	1 ... 62	1 ... 62	1 ... 62	1 ... 30	1 ... 30	1 ... 62
Temperature range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85
EEPROM page mode granularity [byte]	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128
16-bit Timer/Counter	2	2	2	2	2	2	2
True Random Number Generator	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)
Technology	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm
MIFARE** emulation (option)	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K	yes, 1 K or 4 K
Delivery Type Wafer	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)	sawn (75 µ/150 µ)
Delivery Type Module	Contact, Dual Interface, Contactless	-	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	-	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless
Evaluation and Certification							
3rd Party Hardware Evaluation	yes	yes	yes	yes	yes	yes	yes
Security Certificates*	CC EAL5 + EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5 + EMVCo

* Common Criteria (CC), EMVCo, ZKA and other evaluations planned depending on application requirements ** MIFARE is a trademark of NXP Semiconductors N.V.

NXP SmartMX2
Secure Microcontrollers

Product Features	P60D024	P60D040	P60D080	P60D144	P60N144	P60C040	P60C080	P60C144
CPU (enhanced 8/16/24/32 bit instruction set)	Secure_SMX2	Secure_SMX2	Secure_SMX2	Secure_SMX2	Secure_SMX2	Secure_SMX2	Secure_SMX2	Secure_SMX2
ISO Contact Interface	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816
ISO Contactless Interface	ISO 14443	ISO 14443	ISO 14443	ISO 14443	-	-	-	-
NFC Interface type	-	-	-	-	S2C	-	-	-
Concurrent contactless/contact operation	yes	yes	yes	yes	yes	-	-	-
User ROM [byte]	264 K	300 K	384 K	384 K	384 K	300 K	384 K	384 K
RAM (linear addressable) [byte] *	8.125 K	8.125 K	8.125 K	8.125 K	8.125 K	8.125 K	8.125 K	8.125 K
- Standard RAM accessible by CPU [byte]	5.5 K	5.5 K	5.5 K	5.5 K	5.5 K	5.5 K	5.5 K	5.5 K
- RAM accessible by Fame2 and CPU [byte]	2.625 K	2.625 K	2.625 K	2.625 K	2.625 K	2.625 K	2.625 K	2.625 K
EEPROM [byte] *	24 K	40 K	80 K	144 K	144 K	40 K	80 K	144 K
Security Features								
PKI: New Crypto-Engine (Fame2) for ECC/RSA	yes	yes	yes	yes	yes	yes	yes	yes
SBC: Dual/triple key DES-Engine	yes	yes	yes	yes	yes	yes	yes	yes
SBC: AES-Engine key length 128/192/256-bit	yes	yes	yes	yes	yes	yes	yes	yes
Sensors/Glue Logic/Secure Fetch	yes	yes	yes	yes	yes	yes	yes	yes
Memory Management Unit (Firewall)	yes	yes	yes	yes	yes	yes	yes	yes
Additional Product Information								
UART for implemented interfaces	yes	yes	yes	yes	yes	yes	yes	yes
Copy Machine and 16/32-bit CRC-Engine	yes	yes	yes	yes	yes	yes	yes	yes
Supply voltage [V] (continuous operation)	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5
External Clock [MHz]	1 ... 10 (13.56)	1 ... 10 (13.56)	1 ... 10 (13.56)	1 ... 10 (13.56)	1 ... 10	1 ... 10	1 ... 10	1 ... 10
Internal Clock (1 CPU cycle/clock) ** [MHz]	1 ... 20	1 ... 20	1 ... 20	1 ... 20	1 ... 20	1 ... 20	1 ... 20	1 ... 20
Temperature range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85
EEPROM page mode granularity [byte]	1 ... 128	1 ... 256	1 ... 256	1 ... 256	1 ... 256	1 ... 256	1 ... 256	1 ... 256
16-bit Timer/Counter	2	2	2	2	2	2	2	2
True Random Number Generator	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)
Technology	0,09 µm	0,09 µm	0,09 µm	0,09 µm	0,09 µm	0,09 µm	0,09 µm	0,09 µm
MIFARE Plus*** implementation (option)	yes, 2 K or 4 K	yes, 2 K or 4 K	yes, 2 K or 4 K	yes, 2 K or 4 K	yes, 2 K or 4 K	-	-	-
MIFARE DESfire EV1*** implementation (option)	yes, 2 K, 4 K or 8 K	yes, 2 K, 4 K or 8 K	yes, 2 K, 4 K or 8 K	yes, 2 K, 4 K or 8 K	yes, 2 K, 4 K or 8 K	-	-	-
Delivery Type Wafer	12 inch sawn (75 µ/150 µ)	12 inch sawn (75 µ/150 µ)	12 inch sawn (75 µ/150 µ)	12 inch sawn (75 µ/150 µ)	12 inch sawn (150 µ)	12 inch sawn (150 µ)	12 inch sawn (150 µ)	12 inch sawn (150 µ)
Delivery Type Module	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact	Contact	Contact	Contact
Evaluation and Certification								
3rd Party Hardware Evaluation	yes	yes	yes	yes	yes	yes	yes	yes
Security Certificates****	CC EAL6+ EMVCo planned	CC EAL6+ EMVCo planned	CC EAL6+ EMVCo planned	CC EAL6+ EMVCo planned	CC EAL6+ EMVCo planned	CC EAL6+ EMVCo planned	CC EAL6+ EMVCo planned	CC EAL6+ EMVCo planned

* Without implemented MIFARE Plus resp. MIFARE DESFire EV1 implementation ** Equivalent to up to 120 MHz in the SmartMX P5 Family
*** MIFARE and DESFire are a trademark of NXP Semiconductors N.V. **** Common Criteria (CC), EMVCo, ZKA and other evaluations planned depending on application requirements

NXP Contactless
SmarteID Products

Product Features	SmarteID 4K	SmarteID 8K	SmarteID 10K	SmarteID 24K	SmarteID 32K
	P304G003	P308G003	P310G002	P324G004	P332G004
Pre-installed applications	ICAO-like eID	ICAO-like eID	ICAO-like eID	ICAO-like eID	ICAO-like eID
ICAO 9303 file system types	LDS, BAC	LDS, BAC	LDS, BAC	LDS, BAC	LDS, BAC
Enhanced file system types	BAC+	BAC+	BAC+	BAC+	BAC+
Memory					
EEPROM [byte]	4 K	8 K	11 K	24 K	32 K
Write Endurance [cycles]	500 K	500 K	100 K	500 K	500 K
Data Retention [years]	20	20	20	20	20
RF Interface					
Standard	ISO 14443 A	ISO 14443 A	ISO 14443 A	ISO 14443 A	ISO 14443 A
Frequency [MHz]	13.56	13.56	13.56	13.56	13.56
Baudrate [kbit/s]	106/212/424	106/212/424	106/212/424	106/212/424/848	106/212/424/848
Anticollision	True deterministic	True deterministic	True deterministic	True deterministic	True deterministic
Operating Distance [cm]	10	10	10	10	10
Security					
Unique Serial Number [byte]	7	7	7 (4 for MIFARE 4K emulation)	7	7
DES Engine	DES3 <40ms	DES3 <40ms	DES3 <40ms	DES3 <40ms	DES3 <40ms
Exception Sensors	V, f, T, light	V, f, T, light	V, f, T, light	V, f, T, light	V, f, T, light
General Product Information	eID cards, health cards, corporate ID and loyalty cards, ISO 18013 driver's licenses (BAP, configuration 1)				
Operating Temperature Range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85
MIFARE or DESFire implementation (option)	n/a	n/a	MIFARE 4K optional	MIFARE 4K	MIFARE 4K
Packaging					
MOB4 module	P304G003A4	P308G003A4	P310G002A4	P324G004A4	P332G004A4
MOB6 module	P304G003A6	P308G003A6	n/a	P324G004A6	P332G004A6
Sawn wafer (8" on UV irradiated FFC)	P304G003UA	P308G003UA	n/a	n/a	n/a

NXP JCOP Product Range

JCOP Version	JCOP 2.3.1	JCOP 2.3.2			JCOP 2.4.1 R2
JCOP Type	4x	1x	2x	3x	J2A
Communication					
ISO 7816, T=0, T=1 (communication speed, kbit/s)	223.2	223.2	223.2	223.2	223.2
ISO 14443 T=CL (communication speed, kbit/s)	424	-	-	424	-
USB 2.0 LS	yes	-	-	-	-
NFC	S2C	-	-	-	-
Memory					
Available EEPROM Options KByte	72	10/18	10/18/36	12/36/72	40/80
ROM (free for Applets, up to KBytes)	65	17	13	46	76
APDU Buffer (RAM/Bytes)	261	261	261	261	1462
JC&GP					
Java Card Version	2.2.1	2.2.1	2.2.1	2.2.1	2.2.2
Java Card STATIC Option (EEPROM versions)	-	10	10	12	-
VGP CIR	2.0.1	2.1.1	2.1.1	2.1.1	-
Global Platform	2.1.1	2.1.1	2.1.1	2.1.1	2.1.1
SCP Secure Channel Protocol	SCP01, SCP02	SCP01, SCP02	SCP01, SCP02	SCP01, SCP02	SCP01, SCP02
Cryptography					
DES/TDES [bit]	56/112/168	56/112/168	56/112/168	56/112/168	56/112/168
AES [bit]	-	-	256*	-	256
RSA [bit]	2432	-	2432	2432	2048
ECC GF(p) [bit]	-	-	-	-	320
ECC GF(2n) [bit]	239	-	239	239	-
SEED [bit]	128	-	128	128	128
SHA	SHA-1	-	SHA-1	SHA-1	SHA-1 / 2
MD5	yes	-	yes	yes	yes
Random Number Generation	yes	yes	yes	yes	yes
RSA Key Generation	yes	-	yes	yes	yes
Additional Features					
Logical Channels	1	1	1	1	1
RMI Remote Method Invocation	yes	yes	yes	yes	yes
SSD Supplementary Security Domain support	yes	-	yes	yes	yes
Mifare™ API	yes	-	-	yes	-
Extended Length APDU	-	-	-	-	yes
Random UID	yes	-	-	yes	yes
Custom ROM Masking	yes	yes	yes	yes	yes
Technology	0.18 µm	0.18 µm	0.18 µm	0.18 µm	0.14 µm
All Delivery Types Wafer and Module (as available for SmartMX Family)	yes	yes	yes	yes	yes
eGov + Banking Features					
BAC Support (ICAO9303)	yes	-	-	yes	yes
EAC Support (ICAO9303, BSI TR 03110 v1.1.1)	-	-	-	-	yes
BAC/EAC Accelerator API	-	-	-	-	yes
BAC Performance (20KByte Read)	7s	-	-	7s	-
EAC Performance (38KByte Read)	-	-	-	-	-
PACE Support (BSI TR 03110 v2.0.3)	-	-	-	-	-
eGov + Banking Applets					
EAC / BAC Applet	-	-	-	-	EAC v1.0
VISA VSDC	-	v2.7.1	v2.7.1	v2.7.1	-
MCW M/Chip (Contact)	-	-	4 v1.1	-	-
MCW PayPass M/Chip (Dual Interface)	-	-	-	4 v1.3.1	-
MCW Lite & Select (SDA & DDA)	-	-	yes	yes	-
MCP Paypass Magstripe transaction support	-	-	-	yes	-
Certification & Approvals					
EMVCo (HW approval)	yes	yes	yes	yes	yes
VISA	-	yes	yes	yes	-
MasterCard PIC+CAST	-	-	yes	yes	-
Common Criteria (EAL)	-	-	-	-	5+

JCOP Version	JCOP 2.4.1 R2	JCOP 2.4.1 R3			
JCOP Type	J3A	J1A	J2A	J3A	J5A
Communication					
ISO 7816, T=0, T=1 (communication speed, kbit/s)	223.2	223.2	223.2	223.2	223.2
ISO 14443 T=CL (communication speed, kbit/s)	848	-	-	848	848
USB 2.0 LS	-	-	-	-	-
NFC	-	-	-	-	S2C / PN65
Memory					
Available EEPROM Options KByte	40/80	20	20/40/80/95/128	20/40/80/95/128	80
ROM (free for Applets, up to KBytes)	76	76	76	76	76
APDU Buffer (RAM/Bytes)	1462	1462	1462	1462	1462
JC&GP					
Java Card Version	2.2.2	2.2.2	2.2.2	2.2.2	2.2.2
Java Card STATIC Option (EEPROM versions)	-	-	-	-	-
VGP CIR	-	2.1.1	2.1.1	2.1.1	2.1.1
Global Platform	2.1.1	2.1.1	2.1.1	2.1.1	2.1.1
SCP Secure Channel Protocol	SCP01, SCP02	SCP01, SCP02	SCP01, SCP02	SCP01, SCP02	SCP01, SCP02
Cryptography					
DES/TDES [bit]	56/112/168	56/112/168	56/112/168	56/112/168	56/112/168
AES [bit]	256	256	256	256	256
RSA [bit]	2048	-	2048	2048	2048
ECC GF(p) [bit]	320	-	320	320	320
ECC GF(2n) [bit]	-	-	-	-	-
SEED [bit]	128	-	128	128	128
SHA	SHA-1 / 2	-	SHA-1 / 2	SHA-1 / 2	SHA-1 / 2
MD5	yes	-	yes	yes	yes
Random Number Generation	yes	yes	yes	yes	yes
RSA Key Generation	yes	-	yes	yes	yes
Additional Features					
Logical Channels	1	1	1	1	1
RMI Remote Method Invocation	yes	yes	yes	yes	yes
SSD Supplementary Security Domain support	yes	-	yes	yes	yes
Mifare™ API	yes	-	-	yes	yes
Extended Length APDU	yes	-	yes	yes	yes
Random UID	yes	-	-	yes	yes
Custom ROM Masking	yes	yes	yes	yes	yes
Technology	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm
All Delivery Types Wafer and Module (as available for SmartMX Family)	yes	yes	yes	yes	yes
eGov + Banking Features					
BAC Support (ICAO9303)	yes	-	yes	yes	yes
EAC Support (ICAO9303, BSI TR 03110 v1.1.1)	yes	-	yes	yes	yes
BAC/EAC Accelerator API	yes	-	yes	yes	yes
BAC Performance (20KByte Read)	1.2s	-	-	1.2s	1.2s
EAC Performance (38KByte Read)	< 5s	-	-	< 4s	< 4s
PACE Support (BSI TR 03110 v2.0.3)	-	-	-	yes	yes
eGov + Banking Applets					
EAC / BAC Applet	EAC v1.0	-	EAC v1.2	EAC v1.2	-
VISA VSDC	-	2.7.1	2.7.1	2.7.1	-
MCW M/Chip (Contact)	-	4 v1.1	4 v1.1	-	-
MCW PayPass M/Chip (Dual Interface)	-	-	-	4 v1.3.1	-
MCW Lite & Select (SDA & DDA)	-	yes (SDA)	yes	yes	-
MCP Paypass Magstripe transaction support	-	-	-	yes	-
Certification & Approvals					
EMVCo (HW approval)	yes	yes	yes	yes	yes
VISA	-	yes	yes	yes	- **
MasterCard PIC+CAST	-	yes	yes	yes	- **
Common Criteria (EAL)	5+	-	5+	5+	-

* Available on 72 K version only ** EMV compliant

NXP NFC IC's

Product Features	PN512	PN532	PN533	PN544
Operating distance up to [mm] (1)	70	70	70	70
Interfaces				
Serial interface [kbits/s]	up to 1228	up to 1228	up to 1228	up to 460
I²C interface [bits/s]	up to 3.4 M	up to 400 K	-	up to 3.4 M
SPI interface [bits/s]	up to 5 M	up to 5 M	-	up to 8 M
8 bits parallel interface	yes (with HVQFN40)	-	-	-
USB 2.0 (full speed) interface	-	-	yes	-
CL FIFO depth [bytes]	64	64	64	-
Serial/SPI FIFO [bytes]	-	180	-	-
SWP Interface	-	-	-	yes
S²C interface	yes	yes	yes	yes
CPU	-	80c51	80c51	80c51
RAM/ROM/EEPROM [K bytes]	-	1.0 / 40 / 0	1.2 / 44 / 0	5 / 128 / 52
RF Interface				
Carrier Frequency [MHz]	13.56	13.56	13.56	13.56
Analog Interface	fully integrated	fully integrated	fully integrated	fully integrated
Standard and Protocols				
ISO 18092 Peer-to-peer (active/passive)	yes	yes	yes	yes
ISO 14443-A Reader/Writer	yes	yes	yes	yes
ISO 14443-B Reader/Writer	yes	yes	yes	yes
FeliCa Reader/Writer	yes	yes	yes	yes
ISO 15693 Reader/Writer	no	no	no	yes
Card emulation in comb. with secure element	FeliCa RF, ISO 14443-A, MIFARE Classic	FeliCa RF, ISO 14443-A, MIFARE Classic	FeliCa RF, ISO 14443-A, MIFARE Classic	FeliCa RF, ISO 14443-A-B-B', MIFARE Classic
Baudrate [kbits/s]	106/212/424	106/212/424	106/212/424	106/212/424/848
Security Features				
MIFARE classic support	yes	yes	yes	yes
Interface to secure element	S²C	S²C	S²C	S²C/SWP
Additionnal Product Information				
Embedded firmware	no	yes	yes	yes
Software support	HAL, NFC forum reference implementation	HAL, NFC forum reference implementation	HAL, NFC forum reference implementation, USB PC/ SC driver	HAL, NFC forum reference implementation
Integrated LDO voltage regulator	no	yes	no	yes
Low battery mode	no	yes	no	yes
Battery off mode	no	no	no	yes
Supply voltage [V]	2.5 - 3.6	2.7 - 5.5	2.5 - 3.6	2.3 - 5.5
Min. Host interface voltage[V]	1.6	1.6	1.6	1.65 - 1.95
USB bus power supply [V]	-	-	4.2 - 5.5	-
Supply voltage for secure device integrated	no	yes	yes	S² C/SWP
Power down mode typ. [uA]	5	5	12	3
Power down mode with RF level detector on [uA]	10	25	30	50
Transmitter supply current typ. [mA]	60*	60*	60*	35*
Temperature range [C]	-25/+85	-25/+85	-25/+85	-25/+85
Package thickness	0.85 mm	0.85 mm	0.85 mm	0.8 mm
Package size	5x5 or 6x6 mm²	6x6 mm²	6x6 mm²	4.5x4.5 mm²
Package type	HVQFN32 or HVQFN40	HVQFN40	HVQFN40	TFBGA64
Design In kit	OM5571	OM5581	OM5588	OM5596

Transceiver: RF front-end Controller: RF front-end + microcontroller on single die * Depends on antenna matching (1) Depending on antenna, coil size, tuning, and environment

NXP SmartMX
Secure Microcontrollers

Product Features	P5CC008V1A**	P5CC012V1A**	P5CC020	P5CC021	P5CC024	P5CC037
CPU	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51
ISO Contact Interface	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816
ROM [byte]	196 K	196 K	160 K	200 K	160 K	200 K
RAM (linear addressable) [byte]	6 K	6 K	6 K	6 K	6 K	6 K
- Standard RAM [byte]	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K
- RAM accessible by FameXE [byte]	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K
EEPROM [byte]	8 K	12 K	20 K	20 K	24 K	36 K
Security Features						
PKI Crypto-Engine (FameXE)	yes	yes	yes	yes	yes	yes
(RSA key length up to 8192-bit)	yes	yes	yes	yes	yes	yes
RSA (1024 bit) signature generation (CRT)/verification,	99 / 2 ms	99 / 2 ms	99 / 2 ms	99 / 2 ms	99 / 2 ms	99 / 2 ms
Exponent: 216+1 ECC (192-bit signature) generation/ verification	32 / 60 ms	32 / 60 ms	32 / 60 ms	32 / 60 ms	32 / 60 ms	32 / 60 ms
DES-Engine	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs
AES-Engine key length 128/192/256-bit	-	-	-	< 12/13/15 µs	-	-
Exception Sensors	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light
Memory Management Unit (Firewall)	yes	yes	yes	yes	yes	yes
Additional Product Information						
UART for implemented interfaces	yes	yes	yes	yes	yes	yes
CRC-Engine	yes	yes	yes	yes	yes	yes
Supply voltage [V]	2.7 ... 5.5	2.7 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5
External Clock [MHz]	1 ... 10	1 ... 10	1 ... 10	1 ... 10	1 ... 10	1 ... 10
Internal Clock [MHz]	1 ... 62	1 ... 62	1 ... 30	1 ... 30	1 ... 30	1 ... 30
Temperature range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85
EEPROM page mode granularity [byte]	1 ... 64	1 ... 64	1 ... 64	1 ... 128	1 ... 64	1 ... 64
16-bit Timer/Counter	2	2	2	2	2	2
True Random Number Generator	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)
Technology	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm
Delivery Type Wafer	sawn (150 µ)	sawn (150 µ)	sawn (150 µ)	sawn (150 µ)	sawn (150 µ)	sawn (150 µ)
Delivery Type Module	Contact	Contact	Contact	Contact	Contact	Contact
Delivery Type SMD package	-	-	HVQFN32	SSOP20/HVQFN32	HVQFN32	SSOP20/HVQFN32
Evaluation and Certification						
3rd Party Hardware Evaluation	yes	yes	yes	yes	yes	yes
Security Certifcates*	CC EAL5+ planned EMVCo planned	CC EAL5+ planned EMVCo planned	CC EAL5+EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo

Product Features	P5CC040	P5CC052	P5CC073	P5CC080	P5CC081	P5CC144
CPU	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX52	Secure_MX51
ISO Contact Interface	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816
ROM [byte]	200 K	264 K	200 K	200 K	264 K	200 K
RAM (linear addressable) [byte]	6 K	6 K	6 K	6 K	7,5 K	6 K
- Standard RAM [byte]	3.5 K	3.5 K	3.5 K	3.5 K	5 K	3.5 K
- RAM accessible by FameXE [byte]	2.5 K	2.5 K	2.5 K	2.5 K	2,5 K	2.5 K
EEPROM [byte]	40 K	52 K	72 K	80 K	80 K	144 K
Security Features						
PKI Crypto-Engine (FameXE)	yes	yes	yes	yes	yes	yes
(RSA key length up to 8192-bit)	yes	yes	yes	yes	yes	yes
RSA (1024 bit) signature generation (CRT)/verification,	99 / 2 ms	99 / 2 ms	99 / 2 ms	99 / 2 ms	71 / 2 ms	99 / 2 ms
Exponent: 216+1 ECC (192-bit signature) generation/ verification	32 / 60 ms	32 / 60 ms	32 / 60 ms	32 / 60 ms	17 / 33 ms	32 / 60 ms
DES-Engine	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 20 µs	DES3 < 40 µs
AES-Engine key length 128/192/256-bit	< 12/13/15 µs	-	< 12/13/15 µs	< 12/13/15 µs	< 10/11/12 µs	< 12/13/15 µs
Exception Sensors	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light	V, f, T, Light
Memory Management Unit (Firewall)	yes	yes	yes	yes	yes	yes
Additional Product Information						
UART for implemented interfaces	yes	yes	yes	yes	yes	yes
CRC-Engine	yes	yes	yes	yes	yes	yes
Supply voltage [V]	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5	1.62 ... 5.5
External Clock [MHz]	1 ... 10	1 ... 10	1 ... 10	1 ... 10	1 ... 10 (13.56)	1 ... 10
Internal Clock [MHz]	1 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 62	1 ... 30
Temperature range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85
EEPROM page mode granularity [byte]	1 ... 128	1 ... 64	1 ... 128	1 ... 128	1 ... 128	1 ... 128
16-bit Timer/Counter	2	2	2	2	2	2
True Random Number Generator	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)
Technology	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm
Delivery Type Wafer	sawn (150 µ)	sawn (150 µ)	sawn (150 µ)	sawn (150 µ)	sawn (150 µ)	sawn (150 µ)
Delivery Type Module	Contact	Contact	Contact	Contact	Contact	Contact
Delivery Type SMD package	SSOP20/HVQFN32	HVQFN32	SSOP20/HVQFN32	SSOP20/HVQFN32	HVQFN32	SSOP20/HVQFN32
Evaluation and Certification						
3rd Party Hardware Evaluation	yes	yes	yes	yes	yes	yes
Security Certifcates*	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo

* Common Criteria (CC), EMVCo, ZKA and other evaluations planned depending on application requirements ** Available H1 2011

NXP Fast Pay
Secure contactless payment IC

Product Features	
Supported specifications	Visa Contactless Payment Specifcation v2.0.2 A&C 3.0 PayPass Mag Stripe v3.3
Memory	
Write Endurance [cycles]	100 K
Data Retention [years]	20
RF Interface	
Specifications	PayPass – ISO/IEC 14443 Implementation Specification v1.1 EMV Contactless Communication Protocol Specification v2.0.1
Form factor support	Cards (incl 4-line embossing), stickers, others
Security	
Unique Serial Number [byte]	7
DES Engine	DES3
Exception Sensors	V, f, T, light
Certifications	EMVCo, CAST
Packaging	
MOA4 module	P3SR009A4
Sawn wafer (Au-bumped), 120 µm	P3SR009UD

NXP Authentication Products

Product Features	J7C081	J7C020
CPU	Secure_MX51	Secure_MX51
Operating System	JCOP 2.4.2	JCOP 2.4.2
Application software	Anti-Cloning, Profile of Service, Device Authentication	Anti-Cloning, Profile of Service, Device Authentication
Certificate pre-programming service	supported	supported
Memory		
Available EEPROM (free for Applets)	75 KB	16 KB
ROM (free for Applets)	100 KB	20 KB
RAM (linear addressable for Applets)	3.8 KB	2.3 KB
Interface		
I²C (Master & Slave)	100 kbit/s	400 kbit/s
SPI		2 Mbit/s
Number of GPIOs (shared with interfaces)	3	4
Cryptography		
DES/TDES [bit]	56/112/168	56/112/168
AES [bit]	256	256
RSA [bit]	2048	2048
ECC GF(p) [bit]	320	320
SEED [bit]	128	128
SHA	SHA-1 / 2	SHA-1 / 2
MD5	yes	yes
RSA Key Generation	yes	yes
True Random Number Generator	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)	yes, acc. to FIPS 140-2/ AIS 31 (Class P2)
Security		
Secure Fetch	yes	yes
Glue Logic	yes	yes
Exception Sensors	V, f, T, Light	V, T, Light
Memory Management Unit (Firewall)	yes	yes
General Product Information		
Operating Temperature Range [°C]	-25/+85	-25/+90
Supply voltage [V]	1.62 ... 5.6	1.8 ... 3.6
Internal Clock [MHz]	1 ... 62	1 ... 30
Max. sleep mode current (typical)	100 uA	30 uA
Packaging	SSOP20, HVSON-8, HVQFN32	SO8, HVQFN20, HVSON-8

For further details, please check out:
www.nxp.com/identification
or e-mail info.bli@nxp.com

NXP_03_0188_Z_card_ Inside_Full_939775017001_v9.indd 2 10/11/10 16:51