Smart solutions for smart services

NXP founded by Philips

ISO 14443 ISO 15693

NXP Contactless Reader Systems

	Reader ICs							Evaluation Systems				
Product Features	**MF RC500**	**MF RC530**	**MF RC531**	**CL RC632**	**SL RC400**	**MF RC522**	**MF RC 523**	**MF EV700**	**SL EV400**	**CL RD 701**	**MF EV710**	**MF EV852**
Product Family Name			**"Micore I" family**			**"Micore II" family**		**"Pegoda"**		**10 x "Pegoda"**		
Operating distance typ. [mm]	100	100	100	100	100	80	80	75	75	75	75	75
Antenna	-	-	-	-	-	-	-	yes	yes	yes	yes	Yes
FIFO depth [byte]	64	64	64	64	64	64	64	n.a.	n.a.	n.a.	n.a	n.a
Host interface	8-bit parallel	8-bit parallel, SPI	8-bit parallel, SPI	8-bit parallel, SPI	8-bit parallel	SPI, I²C, RS232	SPI, I²C, RS232	USB	USB	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	CL RC632	SL RC400	CL RC 632	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	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	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	-	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	1.66/26.5/53	-	-
Baudrate ISO 18000-6-B and	-	-	-	-	-	-	-	-	-	-	-	-
EPC class 1 Gen2	-	-	-	-	-	-	-	-	-	-	-	-
Standards & Protocols												
NFC Reader	yes	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	yes	-	-
MIFARE Classic protocol	yes	yes	yes	yes	-	Yes	yes	yes	-	yes	yes	yes
ICODE 1 protocol	-	-	-	yes	yes	-	-	yes	yes	yes	-	-
EPC protocol	-	-	-	yes	yes	-	-	yes	yes	yes	-	-
ISO 18000-6B	-	-	-	-	-	-	-	-	-	-	-	-
Security Features												
MIFARE Classic™	yes	yes	yes	yes	-	yes	yes	yes	-	yes	yes	yes
Exception Sensors	V, f	V, f	V, f	V, f	V, f	V, f	V, f	-	-	-		
Additional Product Information												
Supply voltage digital [V]	5	3.3 or 5	3.3 or 5	3.3 or 5	5	2.5 ... 3.6	2.5 ... 3.6	5	5	5	5	5
Supply voltage analog [V]	5	5	5	5	5	2.5 ... 3.6	2.5 ... 3.6	-	-	-	-	-
Power down mode current, typ. [µA]	2	2	2	2	2	1	1	n.a.	n.a.	n.a.	n.a.	n.a.
Wake up time [µs]	1000	1000	1000	1000	1000	1000	1000	n.a.	n.a.	n.a.	n.a.	n.a.
Temperature range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	0/+70	0/+70	0/+70	0/+70	0/+70
Package	SO32	SO32	SO32	SO32	SO32	HVQFN32	HVQFN32	-	-	-	-	-
Approvals												
EMC	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	CE, FCC	CE, FCC	CE, FCC	CE, FCC	CE, FCC
Software Support	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

ISO 7816 ISO 14443

NXP MIFARE™ SAMs for Reader Systems

Product Features	MIFARE SAM MF3 IC D40 SAM	MIFARE SAM AV1 MF3 IC D81 SAM	MIFARE SAM AV2	MF RX852
Memory				
EEPROM size [byte]	72 K	72 K	81 K	81 K
OTP area [bit]	-	-		
Write Endurance [cycles]	100 000	100 000	100 000	100 000
Data Retention [yrs]	10	10	10	10
Organization	128 key entries	128 key entries	128 key entries	128 key entries
RF-Interface				
Acc. to ISO 14443A	ISO 7816, T=1	ISO 7816, T=1	ISO 7816, T=1	ISO 7816, T=1
Frequency [MHz]	1 … 10	1 … 10	1 … 10	1 … 10
Baudrate [kbit/s]	9.6 … 1000	9.6 ... 1500	9.6 … 1500	9.6 ... 1500
Anticollision	-	-	-	yes
Operating Distance [mm]	-	-	-	RC523 / 80mm
Security				
Unique Serial Number [byte]	7	7	7	7
Random Number Generator	yes	yes	yes	yes
Access Keys	128 key entries	128 key entries	128 key entries	128 key entries
Access Conditions	per key entry	per key entry	per key entry	per key entry
MIFARE Classic Security	supported	supported	supported	supported
DES & DES3 Security	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment
AES 128 Security	-	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment
PKI	-	-	MACing / Encipherment	-
RSA	-	-	MACing / Encipherment	-
Packaging				
PCM1.1 Module	P5DF072EV2/ TOPD2050	P5DF072EV2/ T0PD4090	P5DF081	-
HVQFN package	-	HVQFN32: P5DF072EHN/ TOPD4090	HVQFN32	HVQFN48

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™ RO64	ICODE SLI-S ICODE SLI-SY	ICODE SLI	ICODE SLI-L	ICODE UID-OTP	ICODE UID	ICODE EPC	UCODE HSL	UCODE EPC Gen2	UCODE G2XL	UCODE G2XM
Total Memory																
Size [bit]	2048	256	256, 2048	128	512, 1760	64	2048	1024	512	192	192	136	2048	512	368	880
Write Endurance [cycles]	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	100 000
Data Retention [yrs]	10	10	10	10	10	10	10 / 40 [6]	10	10	5	5	5	10	10	50	50
Organisation	64 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	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	24 blocks á 1 byte	24 blocks á 1 byte	17 blocks á 1 byte	64 blocks á 4 bytes	32 blocks á 2 bytes	23 blocks á 2 bytes	55 blocks á 4 bytes
RF-Interface																
According to	HITAG 1	HITAG 2, ISO 11784/85	HITAG 1+, ISO 11784/85	ISO 11784/85	ISO 11784/85	ISO 11784/85	ISO 15693, ISO 18000, EPC [4]	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	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	13.56 MHz	UHF/2.4 GHz	860 - 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 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	-	acc. ISO 15693, ISO 18000, EPC [4]	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 [5]	up to 1.5	up to 2.0 [5]	up to 1.5	up to 1.5	up to 1.5	up to 7	up to 7	up to 10	up to 10
Security																
Unique Serial Number [byte]	4	4	4	4	4	4	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	OTP	-	OTP	bytewise	blockwise	blockwise	blockwise
Access Keys	32-bit	48-bit	48-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	Encrypted Mutual Authentication or Plain	Plain, Password	Plain, Password	-	Plain, Password Pagewise configurable password protection read/write	-	-	-	-	-	-	Plain, Write Password	Plain, Read/Write Password	Plain, Read/Write Password
Encryption Algorithm	yes	yes	yes, for authentication only	-	-	-	-	-	-	-	-	-	-	-	-	-
Special Features																
EAS	-	-	-	-	-	-	yes (Plain, Password)	yes	yes (Plain, Password)	-	-	-	-	yes	yes	yes
AFI	-	-	-	-	-	-	yes	yes	yes	-	-	-	yes	-	-	-
EPC	-	-	-	-	-	-	yes	-	-	yes	yes	yes	-	96 bit	240 bit	240 bit
TTF Modes	-	yes	yes	yes	yes	yes	-	-	-	-	-	-	-	-	-	-
Destroy Command	-	-	-	-	-	-	yes	-	yes	yes	yes	yes	-	yes	yes	yes
Privacy Command	-	-	-	-	-	-	yes	-	yes	-	-	-	-	-	yes, Read Protect	yes, Read Protect
Packaging																
Sawn Wafer	HT1ICS3002W/V9F	HT2ICS2002W/V9F	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sawn Wafer (Au-Bumped)	-	-	HTSICHxx01EW/V4	HTMS1001FUG/AM [1] HTMS8001FUG/AM [2]	HTMS1x01FUG/AM [1] HTMS8x01FUG/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 ICS1201DW/V1	SL2 ICS1101DW/V1	SL2 ICS1001DW/V1	SL3ICS3001FW/V4	SL3ICS1001FW/V7AJ	SL3ICS1202FUG/V7AF	SL3ICS1202FUG/V7AF
Other Packages	MOA2	MOA2, SOT 385-1	FCP2, HVSON2, MOA2	FCP2, HVSON2, SOT-1122	FCP2, HVSON2, SOT-1122	-	FCP2, MOA2	FCP2, MOA2, FCS2-AI, FCS2-Cu	FCP2, MOA2	-	-	-	TSSOP8	FCP2, TSSOP8	FCS2-AI, FCS2-Cu, SOT-1122, TSSOP8	FCS2-AI, FCS2-Cu, SOT-1122, TSSOP8

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

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

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.

ISO 7816

NXP Contact Smart Card Reader ICs

	Analog Interface						Analog & UART	Analog & UART & CPU
Product Features	**TDA8020**	**TDA8023**	**TDA8024**	**TDA8025**	**TDA8026**	**TDA8034**	**TDA8007B**	**TDA8029**
Analog interfaces	2	1	1	1	5	1	2	1
ISO 7816 UART	no	no	no	no	no	no	yes	yes
ISO 7816 dedicated timers	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
Host interface	I²C	I²C	I/O lines	I/O lines	I²C	I/O lines	8 bit parallel	serial or I²C
ESD protection on ISO pads [kV]	6	6	6	6	6	6	6	6
Auxiliary protected lines for C4 and C8 contacts	0	2	2	2	2 (on slot 1)	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
Card supply current @ 5 V V_{cc} [mA]	2x55	55	80	-	55	65	55	65
Card supply current @ 3 V V_{cc} [mA]	2x50	55	65	65	55	65	55	50
Card supply current @ 1.8 V V_{cc} [mA]	-	35	-	65	35	65	35	30
Card supply voltage @1.2 V V_{cc} [mA]	-	-	-	30	-	-	-	-
Card clock frequency max. [MHz]	20	20	26	26	20	26	26	20
Card activation time max. [µs]	135	135	225	240	135	3500	135	225
Card deactivation time max. [µs]	110	110	100	100	100	250	100	100
Protocol Support								
Synchronous card management	-	yes	-	-	yes	-	yes	yes
Asynchronous protocol T=0 and T=1	yes	yes	yes	yes	yes	yes	yes	yes
Security Features								
Voltage supervisor and over current detection	yes	yes	yes	yes	yes	yes	yes	yes
Current protection on VCC, I/O, RST, CLK	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	-	-
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 - 6.0	2.7 - 6.0
Power down current max (µA)	150	2	-	100	25	12	350	20
Temperature range (°C)	-25/+85	-40/+85	-40/+85	-25/+85	-25/+85	-25/+85	-40/+85	-25/+85
Package	LQFP32	TSSOP28	SO28 & TSSOP28	HVQFN32	TFBGA64	HVQFN24 & SO16	LQFP48	LQFP32
Software libraries (EMV 4.2)	-	-	-	-	-	-	yes	yes
NDS compliance	-	-	yes	yes	-	yes	-	yes
EMV compliance	EMV 4.2	EMV 4.2	EMV 4.2	-	EMV 4.2	EMV 4.2	EMV 4.2	EMV 4.2

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 2 K	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 IC S50	MF1 IC 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	2048	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	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											
Unique Serial Number [byte]	7, cascaded	7, cascaded	4	4	4 or 7, optional random ID	4 or 7, optional random ID	4 or 7, optional random ID	4 or 7, optional random ID	7, cascaded	7, cascaded	7, cascaded
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	CRYPTO1 or AES keys per sector	CRYPTO1 or AES keys per sector	CRYPTO1 or AES keys per sector	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	-	-	-
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	-	-	MF1ICS5005W/V9D	MF1ICS7001W/V9D	-	-	-	-	-	-	-
Sawn Wafer (Au-Bumped)	MF0ICU1X01W/V1D	MF0ICU2001DUD (17pF) MF0ICU2101DUD (50pF)	MF1ICS5005W/V1D	MF1ICS7001W/V1D	7B UID MF1SPLUS6001DUD/02 4B UID MF1SPLUS6011DUD/02	7B UID MF1SPLUS8001DUD/02 4B UID MF1SPLUS8011DUD/02	7B UID MF1PLUS6001DUD/02 4B UID MF1PLUS6011DUD/02	7B UID MF1PLUS8001DUD/02 4B UID MF1PLUS8011DUD/02	MF3ICD2101DUD/01	MF3ICD4101DUD/01	MF3ICD8101DUD/01
MOA2 Module	-	-	MF1MOA2S50/D/3 ICN8	-	-				-	-	-
MOA4 Module	-	MF0MOU2001DA4 (17pF) MF0MOU2101DA4 (50pF)	MF1MOA4S50/D	MF1MOA4S70/D	7B UID MF1SPLUS6001DA4/02 4B UID MF1SPLUS6011DA4/02	7B UID MF1SPLUS8001DA4/02 4B UID MF1SPLUS8011DA4/02	7B UID MF1PLUS6001DA4/02 4B UID MF1PLUS6011DA4/02	7B UID MF1PLUS8001DA4/02 4B UID MF1PLUS8011DA4/02	MF3MOD2101DA4/01	MF3MOD4101DA4/01	MF3MOD8101DA4/01
FCP2 Module	MF0FCP2U1X/DH	-	-	-	-	-	-	-	-	-	-
PDM1.1 Module	-	-	-	-	-	-	-	-	-	-	-

*MAD: MIFARE Application Directory **MAD2: MAD Extension for 4 kbyte EEPROM size ***MAD3: MAD2 Extension for DESFire

Development Tools Overview NXP Smart Card Controller Families

Product Family	Tool Components					
	Software Tools	Hardware Tools				
	C-Compiler, Assembler, Linker/Locator	Simulator	Source-Level Debugger, Integrated Development Environment	In-Circuit Emulator	Prototyping Kit	Smart Card Probe
Extended 8051 Architecture						
MIFARE Pro*X* Family	Keil	Keil*	Ashling	Ashling	Ashling	Ashling
Smart*MX* Family	Keil	Keil*	Keil	Ashling	Ashling	Ashling
P5Sxyyy			Ashling	Philips	Keil	Keil
P5Cxyyy						
Smart MIPS Architecture						
HiPerSmart Family P9Sxyyy	MIPS, Distribution via Ashling	MIPS, Distribution via Ashling HPS FPGA Board, distributed via NXP	Ashling	Ashling Philips	Ashling	Ashling

* Product specific simulator extensions are available from NXP free of charge

Development Tool Packages available via NXP Sales

12NC	Type
Smart*MX* Family	
9352 767 14122	OM3700/5ULTRA51SQA
9352 767 15122	OM3702/5EPKSC
9352 767 16122	OM3703/5PKSC
9352 767 17122	OM3704/5CONVKIT
9352 775 22122	OM3730/5ULTRA51
9352 771 99122	OM3740/5DBOX
HiPerSmart Family	
9352 767 07122	OM3720/9VITRA
9352 767 08122	OM3721/9GENIA
9352 767 09122	OM3722/9OPELLA
9352 767 11122	OM3723/9PKSC
9352 767 13122	OM3729/9DEVCD
9352 771 31122	OM3748/9XC2V6000

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NXP Smart*MX*
Dual Interface Security/PKI Controllers

Product Features	P5SD005	P5SD009	P5CD009	P5CD036	P5CD072	P5CN072	P5CT072	P5CD012	P5CD016	P5CD020	P5CD021	P5CD040	P5CD041	P5CN080	P5CN081	P5CD080	P5CD081	P5CD128	P5CN144	P5CD144	P5CD145
CPU	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	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 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	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	ISO 14443	-	ISO 14443	ISO 14443	ISO 14443	ISO 14443	ISO 14443	ISO 14443	ISO 14443	-	-	ISO 14443	ISO 14443	ISO 14443	-	ISO 14443	ISO 14443
USB Interface	-	-	-	-	-	-	USB 2.0 (low speed)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NFC Interface type	-	-	-	-	-	S2C	-	-	-	-	-	-	-	S2C	S2C	-	-	-	S2C	-	-
ROM [byte]	64 K	96 K	96 K	160 K	160 K	160 K	160 K	200 K	264 K	200 K	264 K	200 K	264 K	200 K	264 K	200 K	264 K	264 K	200 K	200 K	264 K
RAM (linear addressable) [byte]	2.25 K	2.25 K	4.5 K	4.5 K	4.5 K	4.5 K	4.5 K	6 K	7.5 K	6 K	7.5 K	6 K	7.5 K	6 K	7.5 K	6 K	7.5 K	7.5 K	6 K	6 K	7.5 K
- Standard RAM [byte]	2.25 K	2.25 K	3.25 K	3.25 K	3.25 K	3.25 K	3.25 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	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]			1.25 K	1.25 K	1.25 K	1.25 K	1.25 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K
EEPROM [byte]	6 K	12 K	12 K	36 K	72 K	72 K	72 K	12 K	16 K	20 K	20 K	40 K	40 K	80 K	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	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
(RSA key length up to 4096-bit)	-	-	yes	yes	yes	yes	yes	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(RSA key length up to 8192-bit)	-	-	-	-	-	-	-	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
RSA (1024 bit) signature generation (CRT)/verification, Exponent: 216+1	-	-	135 / 3 ms	136 / 4 ms	136 / 4 ms	135 / 3 ms	135 / 3 ms	99 / 2 ms	71 / 2 ms	99 / 2 ms	71 / 2 ms	99 / 2 ms	71 / 2 ms	102 / 3 ms	71 / 2 ms	102 / 3 ms	71 / 2 ms	71 / 2 ms	99 / 2 ms	99 / 2 ms	71 / 2 ms
ECC (192-bit signature) generation/ verification	-	-	25 / 35 ms	42 / 76 ms	42 / 76 ms	25 / 35 ms	25 / 35 ms	20 / 30 ms	17 / 33 ms	20 / 30 ms	17 / 33 ms	20 / 30 ms	17 / 33 ms	32 / 60 ms	17 / 33 ms	32 / 60 ms	17 / 33 ms	17 / 33 ms	20 / 30 ms	20 / 30 ms	17 / 33 ms
DES-Engine	DES3 < 40 ps	DES3 < 40 ps	DES3 < 40 us	DES3 < 40 us	DES3 < 40 us	DES3 < 40 us	DES3 < 40 us	DES3 < 40 us	DES3 <20 us	DES3 < 40 us	DES3 <20 us	DES3 < 40 us	DES3 <20 us	DES3 < 40 us	DES3 <20 us	DES3 < 40 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	< 12/13/15 us	< 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	< 10/11/12 us	< 12/13/15 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	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	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	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Additional Product Information																					
UART for implemented interfaces	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CRC-Engine	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	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	1.62 ... 5.5	1.62 ... 5.6	1.62 ... 5.5	1.62 ... 5.6	1.62 ... 5.5	1.62 ... 5.6	1.62 ... 5.5	1.62 ... 5.6	1.62 ... 5.5	1.62 ... 5.6	t.b.d.	1.62 ... 5.5	1.62 ... 5.5	t.b.d.
External Clock [MHz]	1 ... 10 (13.56)	1 ... 10 (13.56)	1 ... 10 (13.56)	1 ... 10 (13.56)	1 ... 10 (13.56)	1 ... 6	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 (13.56)	1 ... 10	1 ... 10 (13.56)	1 ... 10 (13,56)	1 ... 10 (13.56)	t.b.d.	1 ... 10	1 ... 10 (13,56)	t.b.d.
Internal Clock [MHz]	1 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 62	1 ... 30	1 ... 62	1 - ... 30	1 ... 62	1 ... 30	1 ... 62	1 ... 30	1 ... 62	t.b.d.	1 ... 30	1 ... 30	t.b.d.
Temperature range [°C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85
EEPROM page mode granularity [byte]	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128	1 ... 128	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	2	2	2	2	2	2	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)	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)	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	0.18 µm	0.18 µm	0.18 µm	0.18 µm	0.18 µm	0.18 µm	0.18 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	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	yes	yes, 1 K or 4 K	yes	yes, 1 K or 4 K	yes	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	-	yes, 1 K or 4 K
Delivery Type Wafer	sawn (75µ/150µ), unsawn	sawn (75µ/150µ), unsawn	sawn (75µ/150µ), unsawn	sawn (75µ/150µ), unsawn	sawn (75µ/150µ), unsawn	sawn/unsawn	sawn (75µ/150µ), unsawn	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)	sawn (75µ/150µ)
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	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	Contact, Dual Interface, Contactless	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	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Security Certificates*	EMVCo	EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ planned EMVCo planned	CC EAL5+ EMVCo	CC EAL5 + EMVCo	CC EAL5+ planned EMVCo planned

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

** MIFARE is a trademark of NXP B.V.

NXP JCOP Product Range

JCOP Version	JCOP 2.3.1	JCOP 2.3.2			JCOP 2.4.1	
JCOP Type	4x	1x	2x	3x	J2A	J3A
Communication						
ISO 7816, T=0, T=1 (communication speed, kbit/s)	223.2	223.2	223.2	223.2	223.2	223.2
ISO 14443 T=CL (communication speed, kbit/s)	424	-	-	424	-	848
USB 2.0 LS	yes	-	-	-	-	-
NFC	S2C	-	-	-	-	-
Memory						
Available EEPROM Options KByte	72	10/18	10/18/36	12/36/72	40/80	40/80
ROM (free for Applets, up to KBytes)	65	17	13	46	76	76
APDU Buffer (RAM/Bytes)	261	261	261	261	1462	1462
JC&GP						
Java Card Version	2.2.1	2.2.1	2.2.1	2.2.1	2.2.2	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	2.1.1
SCP Secure Channel Protocol	SCP01, SCP02	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	56/112/168
AES [bit]	-	-	256*	-	256	256
RSA [bit]	2432	-	2432	2432	2048	2048
ECC GF(p) [bit]	-	-	-	-	320	320
ECC GF(2n) [bit]	239	-	239	239	-	-
SEED [bit]	128	-	128	128	128	128
SHA	SHA-1	-	SHA-1	SHA-1	SHA-1 / 2	SHA-1 / 2
MD5	yes	-	yes	yes	yes	yes
Random Number Generation	yes	yes	yes	yes	yes	yes
RSA Key Generation	yes	-	yes	yes	yes	yes
Additional Features						
Logical Channels	1	1	1	1	1	1
RMI Remote Method Invocation	yes	yes	yes	yes	yes	yes
SSD Supplementary Security Domain support	yes	-	yes	yes	yes	yes
Mifare™ API	yes	-	-	yes	-	yes
Extended Length APDU	-	-	-	-	yes	yes
Random UID	yes	-	-	yes	yes	yes
Custom ROM Masking	yes	yes	yes	yes	yes	yes
Technology	0.18 µm	0.18 µm	0.18 µm	0.18 µm	0.14 µm	0.14 µm
All Delivery Types Wafer and Module (as available for SmartMX Family)	yes	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
BAC/EAC Accelerator API	-	-	-	-	yes	yes
BAC Performance (20KByte Read)	7s	-	-	7s	-	1.2s
EAC Performance (36KByte Read)	-	-	-	-	-	< 5s
eGov + Banking Applets						
EAC / BAC Applet	-	-	-	-	EAC v1.0	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	yes
VISA	-	yes	yes	yes	-	-
MasterCard PIC+CAST	-	-	yes	yes	-	-
Common Criteria (EAL)	-	-	-	-	5+	5+

* Available on 72K version only ** Not all possible combinations may be commercially available *** planned

NXP Fast Pay
Secure contactless payment IC

Product Features	
Supported specifications	Visa Contactless Payment Specification 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
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
Certfications	EMVCo, CAST
Packaging	
MOB6 module	P3SR009A6
MOA4 module	P3SR009A4
Sawn wafer (Au-bumped), 120µm	P3SR009UD
Sawn wafer (Au-bumped), 75µm	P3SR009UF

NXP Fast Pay
Secure contactless payment IC

Product Features	
Supported specifications	Visa Contactless Payment Specification 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
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
Certfications	EMVCo, CAST
Packaging	
MOB6 module	P3SR009A6
MOA4 module	P3SR009A4
Sawn wafer (Au-bumped), 120µm	P3SR009UD
Sawn wafer (Au-bumped), 75µm	P3SR009UF

NXP Smart*MX*
Contact Interface Security / PKI Controllers

Product Features	P5SC020	P5CC009	P5CC018	P5CC036	P5CU036	P5CC072	P5CC012	P5CC020	P5CC021	P5CC024	P5CC037	P5CC040	P5CC052	P5CC073	P5CC080	P5CC081	P5CC144
CPU	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	Secure_MX51	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	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816	ISO 7816
ISO Contactless Interface	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
USB Interface	-	-	-	-	USB 2.0 (low speed)	-	-	-	-	-	-	-	-	-	-	-	-
ROM [byte]	160 K	96 K	128 K	128 K	160 K	160 K	160 K	160 K	200 K	160 K	200 K	200 K	264 K	200 K	200 K	264 K	200 K
RAM (linear addressable) [byte]	3.5 K	4.5 K	4.5 K	4.5 K	4.5 K	4.5 K	6 K	6 K	6 K	6 K	6 K	6 K	6 K	6 K	6 K	7,5 K	6 K
- Standard RAM [byte]	3.5 K	3.25 K	3.25 K	3.25 K	3.25 K	3.25 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	3.5 K	5 K	3.5 K
- RAM accessible by FameXE [byte]		1.25 K	1.25 K	1.25 K	1.25 K	1.25 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2.5 K	2,5 K	2.5 K
EEPROM [byte]	20 K	10 K	18 K	36 K	36 K	72 K	12 K	20 K	20 K	24 K	36 K	40 K	52 K	72 K	80 K	80 K	144 K
Security Features																	
PKI Crypto-Engine (FameXE)	-	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
(RSA key length up to 4096-bit)	-	yes	yes	yes	yes	yes	-	-	-	-	-	-	-	-	-	-	-
(RSA key length up to 8192-bit)	-	-	-	-	-	-	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
RSA (1024 bit) signature generation (CRT)/verifcation,	-	135 / 3 ms	135 / 3 ms	136 / 4 ms	135 / 3 ms	136 / 4 ms	99 / 2 ms	99 / 2 ms	99 / 2 ms	99 / 2 ms	99 / 2 ms	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/ verifcation	-	25 / 35 ms	25 / 35 ms	42 / 76 ms	25 / 35 ms	42 / 76 ms	20 / 30 ms	20 / 30 ms	20 / 30 ms	20 / 30 ms	20 / 30 ms	20 / 30 ms	20 / 30 ms	20 / 30 ms	20 / 30 ms	17 / 33 ms	20 / 30 ms
DES-Engine	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs < 12/13/15 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs < 12/13/15 µs	DES3 < 40 µs	DES3 < 40 µs	DES3 < 40 µs < 12/13/15 µs	DES3 < 40 µs	DES3 < 40 µs < 12/13/15 µs	DES3 < 40 µs < 12/13/15 µs	DES3 < 20 µs < 10/11/12 µs	DES3 < 40 µs < 12/13/15 µs
AES-Engine key length 128/192/256-bit	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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	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	V, f, T, Light	V, f, T, Light	V, f, T, Light
Memory Management Unit (Firewall)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Additional Product Information																	
UART for implemented interfaces	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CRC-Engine	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	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	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	1.62 ... 5.6	1.62 ... 5.5
External Clock [MHz]	1 ... 10	1 ... 10	1 ... 10	1 ... 10	1 ... 6	1 ... 6	1 ... 10	1 ... 10	1 ... 10	1 ... 10	1 ... 10	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 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 30	1 ... 30	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	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+86	-25/+85
EEPROM page mode granularity [byte]	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 64	1 ... 128	1 ... 64	1 ... 64	1 ... 128	1 ... 64	1 ... 128	1 ... 128	1 ... 128	1 ... 128
16-bit Timer/Counter	2	2	2	2	2	2	2	2	2	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)	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)	yes, acc. to FIPS 140-2 / AIS 31 (Class P2)
Technology	0.14 µm	0.18 µm	0.18 µm	0.18 µm	0.18 µm	0.18 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm	0.14 µm
Delivery Type Wafer	sawn (150µ)	sawn/unsawn (150µ)	sawn/unsawn (150µ)	sawn/unsawn (150µ)	sawn/unsawn (150µ)	sawn/unsawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)	sawn (150µ)
Delivery Type Module	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact	Contact
Delivery Type SMD package	HVQFN32	SSOP20	-	SSOP20	-	SSOP20	HVQFN32	HVQFN32	-	HVQFN32	HVQFN32	-	HVQFN32	-	-	HVQFN32	-
Evaluation and Certification																	
3rd Party Hardware Evaluation	planned	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Security Certificates*	CC EAL5+ planned EMVCo planned	CC EAL5+ EMVCo	EMVCo	CC EAL5+ EMVCo	-	CC EAL5+ EMVCo	CC EAL5+ EMVCo planned	CC EAL5+ planned EMVCo planned	CC EAL5+ EMVCo	CC EAL5+ planned EMVCo planned	CC EAL5+ planned EMVCo planned	CC EAL5+ EMVCo	CC EAL5+ planned EMVCo planned	CC EAL5+ EMVCo	CC EAL5+ EMVCo	CC EAL5+ planned EMVCo planned	CC EAL5+ EMVCo

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

NXP Contactless Smart eID Products

Product Features	Smart eID P304G003	Smart eID P308G003	Smart eID P310G002
pre-installed applications			
ICAO 9303 fle system types	LDS, BAC	LDS, BAC	LDS, BAC
Enhanced fle system types	BAC+	BAC+	BAC+
Memory			
EEPROM [byte]	4 K	8 K	11 K
Write Endurance [cycles]	100 K	100 K	100 K
Data Retention [years]	20	20	20
RF Interface			
Standard	ISO 14443 A	ISO 14443 A	ISO 14443 A
Frequency [MHz]	13.56	13.56	13.56
Baudrate [kbit/s]	106/212/424	106/212/424	106/212/424
Anticollision	True deterministic	True deterministic	True deterministic
Operating Distance [cm]	10	1 0	10
Security			
Unique Serial Number [byte]	7	7	7 (4 for MIFARE 4K emulation)
DES Engine	DES3 <40ms	DES3 <40ms	DES3 <40ms
Exception Sensors	V, f, T, light	V, f, T, light	V, f, T, light
General Product Information			
Operating Temperature Range [°C]	-25/+85	-25/+85	-25/+85
MIFARE or DESFire implementation (option)	n/a	n/a	MIFARE 4K optional
Packaging			
MOB4 module	P304G003A4	P308G003A4	P310G002A4
MOB6 module	P304G003A6	P308G003A6	n/a
Sawn wafer (8” on UV irradiated FFC)	P304G003UA	P308G003UA	n/a

ISO/IEC 18092 ISO/IEC 14443

NXP NFC devices

	NFC Transceivers		NFC Controllers			
Product features	**PN511**	**PN512**	**PN531**	**PN532**	**PN533**	**PN544**
Operating distance typ [mm]	Up to 100 depending on mode, coil…	Up to 100 depending on mode, coil…	Up to 100 depending on mode, coil…	Up to 100 depending on mode, coil…	Up to 100 depending on mode, coil…	Up to 100 depending on mode, coil…
Interfaces						
Serial interface [Mbits/s]	up to 1.228	up to 1.228	up to 1.228	up to 1.228	up to 1.228	460 800 bit/s
I²C interface [bits/s]	400 K /3.4 M	400 K /3.4 M	400 K	400 K	-	400 K /3.4 M
SPI interface [Mbits/s]	up to 5	up to 5	up to 5	up to 5	-	8
8 bits parallel interface	yes (with HVQFN40)	yes (with HVQFN40)	-	-	-	-
USB 2.0 (full speed) interface	no	no	yes	-	yes	-
CL FIFO depth [bytes]	64	64	64	64	64	N/A
Serial/SPI FIFO [bytes]	-	-	180	180	180	N/A
SWP Interface	-	-	-	-	-	yes
S²C interface	yes	yes	yes	yes	yes	yes
CPU	no	no	80C51	80C51	80C51	HT80C51MX
RAM/ROM/EEPROM [bytes]	-	-	1 K/32 K	1 K/40 K	1.2 K/44 K	5 K/128 K/52 K
RF interface						
Carrier Frequency [MHz]	13.56	13.56	13.56	13.56	13.56	13.56
Analog Interface	fully integrated	fully integrated	fully integrated	fully integrated	fully integrated	fully integrated
Standard and Protocols						
ISO 18092 Peer-to-peer (active/passive)	yes	yes	yes	yes	yes	yes
ISO 14443-A Reader/Writer	yes	yes	yes	yes	yes	yes
ISO 14443-B Reader/Writer	no	yes	no	yes	yes	yes
Felica Reader/Writer	yes	yes	yes	yes	yes	yes
ISO 15693 Reader/Writer	no	no	no	no	no	yes
Card emulation	FeliCa RF, ISO 14443-A, MIFARE	FeliCa RF, ISO 14443-A, MIFARE	FeliCa RF, ISO 14443-A, MIFARE	FeliCa RF, ISO 14443-A, MIFARE	FeliCa RF, ISO 14443-A, MIFARE	FeliCa RF, ISO 14443-A-B-B', MIFARE
Baudrate [kbits/s]	106/212/424	106/212/424	106/212/424	106/212/424	106/212/424	106/212/424/848
Security features						
MIFARE classic	yes	yes	yes	yes	yes	yes
Interface to smart card controller	S²C	S²C	S²C	S²C	S²C	S²C/SWP
Additionnal Product information						
Embedded firmware	no	no	yes	yes	yes	yes
Middleware	HAL, NFC forum reference implementation	HAL, NFC forum reference implementation	HAL, NFC forum reference implementation	HAL, NFC forum reference implementation	HAL, NFC forum reference implementation	HAL, NFC forum reference implementation
Integrated LDO voltage regulator	no	no	no	yes	no	yes
Low battery mode	no	no	no	yes	no	yes
Battery off mode	no	no	no	no	no	yes
Supply voltage [V]	2.5 - 3.6	2.5 - 3.6	2.5 - 4.0	2.7 - 5.5	2.5 - 3.6	2.3 – 5.5
Min. Host interface voltage[V]	1.6	1.6	1.6	1.6	1.6	1.65 – 1.95
USB bus power supply [V]	-	-	4.2 - 5.5	-	4.2 - 5.5	-
Supply voltage for secure device integrated	no	no	yes	yes	yes	S²C/SWP
Power down mode typ. [uA]	5	5	10	5	12	3
Power down mode with RF level detector on [uA]	10	10	30	25	30	50
Transmitter supply current typ. [mA]	60	60	60	60	60	60
Temperature range [C]	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85	-25/+85
Package thickness	0.85 mm	0.85 mm	0.85 mm	0.85 mm	0.85 mm	0.8 mm
Package size	5x5 or 6x6 mm²	5x5 or 6x6 mm²	6x6 mm²	6x6 mm²	6x6 mm²	4.5x4.5 mm²
Package type	HVQFN32 or HVQFN40	HVQFN32 or HVQFN40	HVQFN40	HVQFN40	HVQFN40	TFBGA64
Design In kit	OM5561	OM5571	OM5555	OM5581	OM5588	OM5596

Transceiver: RF front-end Controller: RF front-end + microcontroller on single die

Specification subject to change without notice.

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Identification product range

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