

## NXP Contactless Mifare® Smart Card ICs

Product Features	Mifare® Ultralight MF0 IC U1X	Mifare® Std 1k MF1 IC S50	Mifare® Std 4k MF1 IC S70	Mifare® DESFire 2k MF3 IC D21	Mifare® DESFire 4k MF3 IC D41	Mifare® DESFire 8k MF3 IC D81	Mifare® DESFire SAM MF3 IC D40 SAM	Mifare® DESFire8 SAM-X MF3 IC D81 SAM
<b>Memory</b>								
EEPROM size [byte]	64	1024	4096	2048	4096	8192	72k	72k
OTP area [bit]	32	-	-	-	-	-	-	-
Write Endurance [cycles]	10 000	100 000	100 000	500 000	500 000	500 000	100 000	100 000
Data Retention [yrs]	5	10	10	10	10	10	10	10
Organization	16 pages á 4 byte	16 sectors á 64 byte	32 sectors á 64 byte	flexible file system	flexible file system	flexible file system	128 key entries	128 key entries
<b>RF-Interface</b>								
Acc. to ISO 14443A	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	ISO 7816, T=1	ISO 7816, T=1
Frequency [MHz]	13.56	13.56	13.56	13.56	13.56	13.56	1 ... 10	1 ... 10
Baudrate [kbit/s]	106	106	106	106 ... 848	106 ... 848	106 ... 848	9.6 ... 1000	9.6 ... 1500
Anticollision	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	-	-
<b>Security</b>								
Unique Serial Number [byte]	7, cascaded	4	4	7, cascaded	7, cascaded	7, cascaded	7	7
Random Number Generator	yes	yes	yes	yes	yes	yes	yes	yes
Access Keys	-	2 keys	2 keys	14 keys	14 keys	14 keys	128 key entries	128 key entries
Access Conditions	per page	per sector	per sector	per file	per file	per file	per key entry	per key entry
Mifare® Classic Security	-	supported	supported	-	-	-	-	supported
DES & DES3 Security	-	-	-	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment
AES 128 Security	-	-	-	MACing / Encipherment	MACing / Encipherment	MACing / Encipherment	-	MACing / Encipherment
Anti-tear supported by chip	-	for value blocks	for value blocks	yes	yes	yes	-	-
<b>Special Features</b>								
Multi-application	-	supports MAD*	supports MAD2**	28 applications, MAD3***	28 applications, MAD3***	28 applications, MAD3***	-	-
Purse Functionality	-	Value block format	Value block format	Value file	Value file	Value file	-	-
Secure Transport Transaction	48 byte read 16 byte write	512 byte read 16 byte write	512 byte read 128 byte write	512 byte read 128 byte write	512 byte read 128 byte write	512 byte read 128 byte write	-	-
Transaction Time [ms]	31.4	164	140	89	89	89	-	-
<b>Packaging</b>								
Sawn Wafer	-	MF1IC55005W/V9D	MF1IC57001W/V9D	-	-	-	-	-
Sawn Wafer (Au-Bumped)	MF0ICU1X01W/V1D	MF1IC55005W/V1D	MF1IC57001W/V1D	MF3ICD2101DW/V110	MF3ICD4101DW/V110	MF3ICD8101DW/V110	-	-
MOA2 Module	-	MF1MOA2550/D3F	-	-	-	-	-	-
MOA4 Module	-	MF1MOA4550/D	MF1MOA4570/D	MF3MOD2101DW/410	MF3MOD4101DW/410	MF3MOD8101DW/410	-	-
FCP2 Module	MF0FCP2U1X/DH	MF1FCP2550/DH	-	-	-	-	-	-
PDM1.1 Module	-	-	-	-	-	-	PSCT072EVO/TOM68220	PSCT072EVO/TOM68220
PCM1.1 Module	-	-	-	-	-	-	-	PSDF072EVO/TOPxxxx0

\*MAD: Mifare® Application Directory

\*\*MAD2: MAD Extension for 4 kbyte EEPROM size

\*\*\*MAD3: MAD2 Extension for DESFire