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NFC tag IC family overview – 13,56 MHz (HF)

NTAG

Product features	NTAG® 210µ	NTAG® 210	NTAG® 212	NTAG® 213 / 213F	NTAG® 215	NTAG® 216 / 216F	NTAG® I²C 1K	NTAG® I²C 2K	NTAG® I²C *plus* 1K	NTAG® I²C *plus* 2K	NTAG® 213 Tag Tamper	NTAG® 413 DNA
Memory												
NFC Forum type	NFC Type 2 Tag	NFC Type 2 Tag	NFC Type 2 Tag	NFC Type 2 Tag	NFC Type 2 Tag	NFC Type 2 Tag	NFC Type 2 Tag	NFC Type 2 Tag	NFC Type 2 Tag	NFC Type 2 Tag	NFC Forum Type 2 Tag	NFC Forum Type 4 Tag V2.0
EEPROM size [byte]	80 (20 pages á 4 byte)	80 (20 pages á 4 byte)	164 (41 pages á 4 byte)	180 (45 pages á 4 byte)	540 (135 pages á 4 byte)	924 (231 pages á 4 byte)	1024	2048	1024	2048	184 (46 pages á 4 byte)	320
User memory [byte]	48	48	128	144	504	888	888	1904	888	1912	144	160
Write endurance [cycles]	100.000	100.000	100.000	100.000	100.000	100.000	200.000	200.000	500.000	500.000	100.000	500.000
Data retention [yrs]	10	10	10	10	10	10	20	20	20	20	10	50
RF-Interface												
According to	ISO14443A (up to layer 3) NFC Forum Type 2 Tag	ISO14443A (up to layer 3) NFC Forum Type 2 Tag	ISO14443A (up to layer 3) NFC Forum Type 2 Tag	ISO14443A (up to layer 3) NFC Forum Type 2 Tag	ISO14443A (up to layer 3) NFC Forum Type 2 Tag	ISO14443A (up to layer 3) NFC Forum Type 2 Tag	ISO14443A (up to layer 3) NFC Forum Type 2 Tag	ISO14443A (up to layer 3) NFC Forum Type 2 Tag	ISO14443A 1-3 NFC Forum Type 2 Tag	ISO14443A 1-3 NFC Forum Type 2 Tag	ISO/IEC14443A (up to layer 3) NFC Forum Type 2 Tag	ISO/IEC14443A (up to layer 4) NFC Forum Type 4 Tag V2.0
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
Baud-rate[KBit/s]	106	106	106	106	106	106	106	106	106	106	106	106/ 212/ 424
Anticollision	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise	bit-wise
Security												
Unique serial number [byte]	7, cascaded	7, cascaded	7, cascaded	7, cascaded	7, cascaded	7, cascaded	7, cascaded	7, cascaded	7, cascaded	7, cascaded	7, cascaded	7, cascaded
Access keys	-	32 bit	32 bit	32 bit	32 bit	32 bit	-	-	32 bit	32 bit	32 bit	3 x 128 bit
Access conditions	-	write, read and write	write, read and write	write, read and write	write, read and write	write, read and write	write, read and write	write, read and write	write, read and write	write, read and write	write, read and write	write, read and write
Write protection	-	blockwise	blockwise	blockwise	blockwise	blockwise	blockwise	blockwise	blockwise	blockwise	blockwise	-
Security	-	password	password	password	password	password	-	-	password	password	password	128-bit AES
Special features												
Field detection pin	-	-	-	✓ [1] (configurable)	-	✓ [1] (configurable)	✓ [1] (configurable)	✓ [1] (configurable)	✓ [1] (configurable)	✓ [1] (configurable)	-	-
I²C interface	-	-	-	-	-	-	✓	✓	✓	✓	-	-
Others	• Originality check with customizable (reprogrammable) originality signature	• UID ASCII mirror • Originality check • Fast Read	• UID ASCII mirror • Originality check • Fast Read	• UID ASCII mirror • NFC counter • NFC counter ASCII mirror • Originality check • Fast Read • Sleep mode via FD pin[1]	• UID ASCII mirror • NFC counter • NFC counter ASCII mirror • Originality check • Fast Read	• UID ASCII mirror • NFC counter • NFC counter ASCII mirror • Originality check • Fast Read • Sleep mode via FD pin[1]	• Passthrough mode 64 bytes SRAM buffer • Energy harvesting	• Passthrough mode 64 bytes SRAM buffer • Energy harvesting	• Passthrough mode 64 bytes SRAM buffer • Energy harvesting • $T_{amb} = 105°C$	• Passthrough mode 64 bytes SRAM buffer • Energy harvesting • $T_{amb} = 105°C$	• UID ASCII mirror • NFC counter • NFC counter ASCII mirror • Programmable Originality Signature • Fast Read • Tag Tamper detection • Current loop status command	• SUN – secure unique NDEF message • NFC counter • Flexible mirroring offset for UID, • NFC tap counter, CMAC • Flexible CMAC input • Originality Signature • Tamper resistant hardware
Packages & capacitance types												
Sawn wafer (Au-Bumped)	NT2L1001G0DUD NT2H1001G0DUD	NT2L1011G0DUD	-	NT2H1311G0DUD	NT2H1511G0DUD	NT2H1611G0DUD	NT3H1101W0FUG	NT3H1201W0FUG	NT3H2111W0FUG	NT3H2211W0FUG	-	-
HXSON4 (SOT1192-1)	-	-	-	NT2H1311F0DTL [1]	-	NT2H1611F0DTL [1]	-	-	-	-	-	-
XQFN8	-	-	-	-	-	-	NT3H1101FHK	NT3H1201FHK	NT3H2111W0FHK	NT3H221W01FHK	-	-
TSSOP8	-	-	-	-	-	-	NT3H1101FTT	NT3H1201FTT	NT3H2111W0FTT	NT3H2211W0FTT	-	-
MOA8	-	-	-	NT2H1311G0DA8	NT2H1511G0DA8	NT2H1611G0DA8	-	-	NT3H2111W0FT1	NT3H2211W0FT1	-	-
Cres Capacitance [pF]	17/50	17	17	50	50	50	50	50	50	50	50	70

[1] NTAG 21x F version only

Low frequency IC family overview – 100-150 KHz (LF)

HITAG

Product features	HITAG® 1	HITAG® 2	HITAG® S 256	HITAG® S 2048	HITAG® µ	HITAG® µ Advanced	HITAG® µ Advanced +	HITAG® RO
Memory								
Size [bit]	2048	256	256	2048	128	512	1760	64
Write endurance [cycles]	100.000	100.000	100.000	100.000	100.000	100.000	100.000	-
Data retention [yrs]	10	10	10	10	10	10	10	10
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	2 blocks á 4 bytes
RF Interface								
According to	HITAG 1	HITAG 2 ISO 11784/85	HITAG 1+ ISO 11784/85	HITAG 1+ ISO 11784/85	ISO 11784/85	ISO 11784/85 ISO 14223	ISO 11784/85 ISO 14223	-
Frequency	100-150 kHz	100-150 kHz	100-150 kHz	100-150 kHz	100-150 kHz	100-150 kHz	100-150 kHz	100-150 kHz
Baud-rate[KBit/s]	up to 4	up to 4	up to 8	up to 8	up to 8	up to 8	up to 8	-
Anti-collision	collision detection	-	collision detection	collision detection	-	collision detection	collision detection	-
Security								
Unique ID [byte]	4	4	4	4	6	6	6	5
Access keys	32 bit	48 bit	48 bit	48 bit	32 bit	32 bit	32 bit	-
Access conditions	Encrypted mutual authentication or plain	Encrypted mutual authentication or plain	Authentication or plain	Authentication or plain	Plain, password	Plain, password	Plain, password	-
Encryption algorithm	✓	✓	for authentication only	for authentication only	-	-	-	-
Special features								
TTF modes	-	✓	✓	✓	✓	✓	✓	✓
RTF modes	✓	✓	✓	✓	-	✓	✓	
Write ISO 11785	-	-	-	-	✓	✓	✓	-
Delivery types								
Sawn wafer (Au Megabump)	-	-	HTS IC C56 01EW/C7	HTS IC C48 01EW/C7	-	✓	✓	✓
Sawn wafer (Au bump)	HT1 IC S30 02W/V6F	HT2 IC S2002W/V6F/R	HTS IC H56 01EW/V7	HTS IC H48 01EW/V7	-	-	-	-
MOA4	HT1 MOA4 S30/E/3	HT2 MOA4 S20/E/3/R	HTS MO H56 02EV	HTS MO H48 02EV	-	-	-	-
SOT385-1 (Stick)	-	HT2 DC20 S20/F/R	-	-	-	-	-	-
SOT1122	-	-	-	-	HTMS8001FTB/AF	HTMS8101FTB/AF	HTMS8201FTB/AF	-
HVSON2	-	-	HTS H56 01 ETK	HTS H48 01 ETK	HTMS8001FTK/AF	HTMS8101FTK/AF	HTMS8201FTK/AF	-
Capacitance 210pF +/- 10%	✓	✓	-	-	-	-	-	-
Capacitance 210pF +/- 5%	-	-	✓	✓	-	-	-	-
Capacitance 280pF +/- 5%	-	-	-	-	HTMS8001FUG/AM	HTMS8101FUG/AM	HTMS8201FUG/AM	HTCICC6403FUG/AM

Smart label IC family overview – 13.56 MHz (HF)

ICODE

Product features	ICODE® SLI-L	ICODE® SLIX-L	ICODE® SLI	ICODE ® SLIX	ICODE® SLI-S	ICODE®SLIX-S	ICODE® SLIX 2	ICODE® ILT	ICODE® ILT-M	ICODE®DNA
Standard	ISO 18000-3M1 ISO 15693	ISO 18000-3M1 ISO 15693	ISO 18000-3M1 ISO 15693	ISO 18000-3M1 ISO 15693	ISO 18000-3M1 ISO 15693 EPC Class 1 [2]	ISO 18000-3M1 ISO 15693	ISO 18000-3M1 ISO 15693	EPC Class-1 HF[1] ISO 18000-3M3	EPC Class-1 HF[1] ISO 18000-3M3	ISO 18000-3M1 ISO 15693-2, 3
User memory [bit]	256	256	896	896	1280	1280	2528	-	512	2016
EPC code size [bit]	-	-	-	-	96	-	-	up to 240	up to 240	-
UID (TID[1]) size[bit]	64	64	64	64	64	64	64	96 (TID)	96 (TID)	46
Data re tention [Years]	10	50	10	50	10	50	50	50	50	50
Write endurance [cycles]	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000	100.000
Anticollision speed	up to 60 units/s	up to 60 units/s	up to 60 units/s	up to 60 units/s	up to 60 units/s up to 200 units/s [2]	up to 60 units/s	90 units/s [3]	up to 700 units/s	up to 700 units/sc	up to 90 units/s [3]
Fast inventory	✓	✓	✓	✓	✓	✓	✓	-	-	✓
Security functions										
EAS protection	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EAS password protection	32 bit password	32 bit password	-	32 bit password	32 bit password	32 bit password	32 bit password	32 bit password	32 bit password	AES - 128 bit
EAS selective	✓	✓	-		✓	✓	✓	-	-	✓
AFI protection	✓	✓	✓	✓	✓	✓	✓	-	-	AES - 128 bit
AFI password protection	-	32 bit password	-	32 bit password	-	32 bit password	32 bit password	-	-	✓
Persistent qiet	-	-	-	-	-	-	✓	-	-	✓
Memory write lock	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Memory access password protection	-	-	-	-	32 bit password	32 bit password	32 bit password	-	-	AES - 128 bit
Privacy password protection	32 bit password	32 bit password	-	-	32 bit password	32 bit password	32 bit password	32 bit password	32 bit password	AES - 128 bit
Destroy password protection	32 bit password	32 bit password	-		32 bit password	32 bit password	32 bit password	-	-	AES - 128 bit
Counter	-	-	-		-	-	✓	-	-	-
Originality signature	-	-	-		-	-	✓	-	-	re-programmable
Cres capacitance [pF]	23.5 / 97	23.5 / 97	23.5	no / 23.5 / 97	23.5 / 97	23.5 / 97	23.5	0 / 23.5 / 97	0 / 23.5 / 97	23.5
Delivery types										
Wafer FFC	SL2ICS5001EW/V7	SL2S5002FUD	SL2ICS2001DW/V1D	SL2S2002FUD	SL2ICS5301EW/V7	SL2S5302FUD	SL2S2602FUD/BG	SL2S1502FUD	SL2S1512FUD	SL2S6002FUD/BG
Wafer FCC – HC	SL2ICS5101EW/V7	SL2S5102FUD	-	SL2S2102FUD	SL2ICS5401EW/V7	SL2S5402FUD	-	SL2S1602FUD	SL2S1612FUD	-
Wafer FCC- NC	-	-	-	SL2S2202FUD	-	-	-	SL2S1402FUD	SL2S1412FUD	-
SOT1122	-	SL2S5002FTB	-	SL2S2002FTB	-	SL2S5302FTB	-	SL2S1502FTB	SL2S1512FTB	-
SOT1122- HC	-	-	-	SL2S2102FTB	-	-	-	-	SL2S1612FTB	-
SOT1122- NC	-	-	-	-	-	-	-	-	SL2S1412FTB	-
MOA8	-	-	-	SL2S2002FA8	-	-	-	-	-	-

[1] EPCglobal Specification: EPC Class-1 HF RFID Air Interface Protocol
[2] EPCglobal/Auto-ID Center Specification: 13.56 MHz ISM Band Class 1 Radio Frequency Identification Tag Interface
[3] With extended fast inventory read

For further details please refer to:
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UHF tag IC family overview – 840-960 MHz (UHF)

UCODE RAIN RFID

Product features	UCODE® G2XL	UCODE® G2XM	UCODE® G2iL	UCODE® G2iL+	UCODE® G2iM	UCODE® G2iM+	UCODE® 7	UCODE® 7m	UCODE® 7xm	UCODE® 7xm+	UCODE® 8	UCODE® 8m	UCODE® I²C	UCODE® DNA®	UCODE® DNA Track	UCODE® DNA City
RF Interface	840 - 960 MHz															
EPC global standard	1.0.9 / 1.1.0	1.0.9 / 1.1.1	1.2.0	1.2.0	1.2.0	1.2.0	1.2.0	1.2.0	1.2.0	1.2.0	2.0.1	2.0.1	1.2.0	GS1 Gen2 v2.0 ISO29167-10 ISO18000-63	GS1 Gen2 v2.0 ISO29167-10 ISO18000-63	GS1 Gen2 v2.0 ISO29167-10 ISO18000-63
User memory [bit]	-	512	-	-	512	up to 640 dep. on EPC size	-	32	2048	2048	-	32	3328	3072	256	1024
EPC code size [bit]	240	240	128	128	256	256-448	128	128	448	448	128	96	160	224	448	224
TID size[bit]	64	64	64	64	96	96	96	96	96	96	96	96	96	96	96	96
Access password [bit]	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Kill password [bit]	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
User password	-	-	-	-	-	32	-	-	-	-	-	-	-	-	-	-
Data retention [Years]	50	50	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Write endurance [cycles]	100.000	100.000	10.000	10.000	10.000	10.000	100.000	100.000	100.000	100.000	100.000	100.000	50.000	100.000	100.000	100.000
Feature set																
Brand Identifier	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-
Self Adjust	-	-	-	-	-	-	-	-	-	-	✓	✓	-	-	-	-
Read protection (bankwise)	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	✓	-	-	-
Block perma lock	-	✓	-	-	✓	✓	-	-	✓	✓	-	-	-	✓	✓	✓
Tag authenticaten	-	-	-	-	-	-	-	-	-	-	-	-	-	AES – 128 Bit, 2 keys	AES-128 bit, 1 key	AES-128 bit, 1 key
Block write	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Segmented user memory	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	✓
PSF (Product Status Flag- EAS)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pre-serialization of 96-bit EPC	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓
Parallel encoding	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	✓	✓
Tag power indicator	-	-	-	-	-	-	✓	✓	✓	✓	-	-	-	✓	✓	✓
Tag tamper alarm	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-
Digital switch	-	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-
External supply mode	-	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-
Backscatter strength reduction	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Read range reduction	-	-	✓	✓	-	✓	-	-	-	-	✓	✓	✓	✓	✓	✓
Digital signature [bit]	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
Untraceable	-	-	-	-	-	-	-	-	✓	✓	✓	✓	-	✓, with crypto	✓	✓, with crypto
Data transfer	-	-	-	✓	-	✓	-	-	-	-	-	-	✓	-	-	-
Bridge mode for fast data transfer	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
2 UHF Front Ends	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
I²C Interface	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-	-
Trust provisioning service	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	-	-
Packages																
Wafer FFC 150µm	SL3ICS1202UG	SL3ICS1002FUG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wafer FCC 120µm	-	-	SL3S1203FUD	SL3S1213FUD	SL3S1003FUD	SL3S1013FUD	SL3S1204FUD/ BG1	SL3S1214FUD/ BG1	SL3S1024FUD/ BG1	SL3S1014FUD/ BG1	SL3S1205FUD/ HA	SL3S1215FUD/ HA	-	SL3S5002N0FUD/ 00BG1	SL3S5050N0FUD/ 00BG1	SL3S5005N0FUD/ 00BG1
SOT1122	SL3S1202FTB1	SL3S1002FTB1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SOT886	-	-	SL3S1203FTB0	-	-	SL3S1013FTB0	SL3S1204FTB0/01	SL3S1214FTB0/1	-	-	-	-	-	-	-	-
SOT 902-3 (XQFN8)	-	-	-	-	-	-	-	-	-	-	-	-	SL3S4011FHK	-	-	-

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