



## SRIX4K

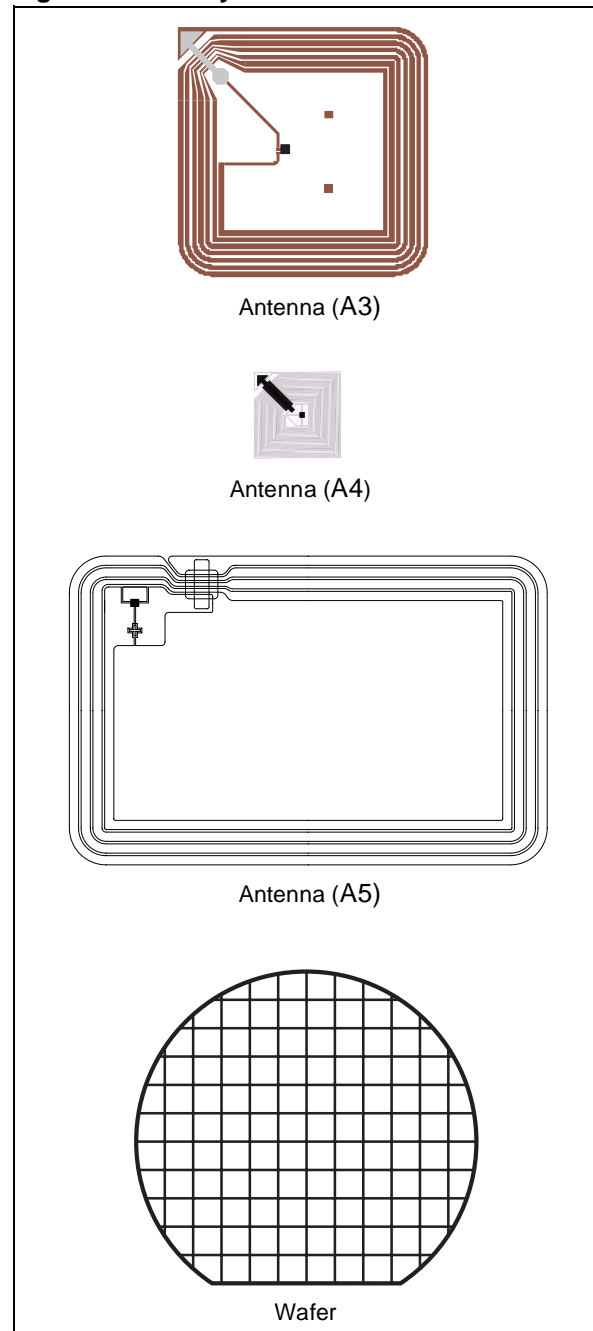
### 13.56MHz Short Range Contactless Memory Chip With 4096 bit EEPROM, Anti-Collision and Anti-Clone Functions

DATA BRIEFING

#### FEATURES SUMMARY

- ISO 14443 - 2 Type B Air Interface Compliant
- ISO 14443 - 3 Type B Frame Format Compliant
- 13.56MHz Carrier Frequency
- 847kHz Sub-carrier Frequency
- 106 Kbit/s Data Transfer
- France Telecom Proprietary Anti-Clone Function
- 8 bits Chip\_ID based anticollision system
- 2 Count-Down Binary Counters
  - 32 bits each
  - $2^{32}$  units to be counted-down
- 64-bit Unique Identifier
- 4096-bit EEPROM with Write Protect Feature
- READ BLOCK & WRITE BLOCK (32 Bits)
- Internal Tuning Capacitor
- 1million ERASE/WRITE Cycles
- 10-Year Data Retention
- Self-Timed Programming Cycle
- 5ms Typical Programming Time

Figure 1. Delivery Forms

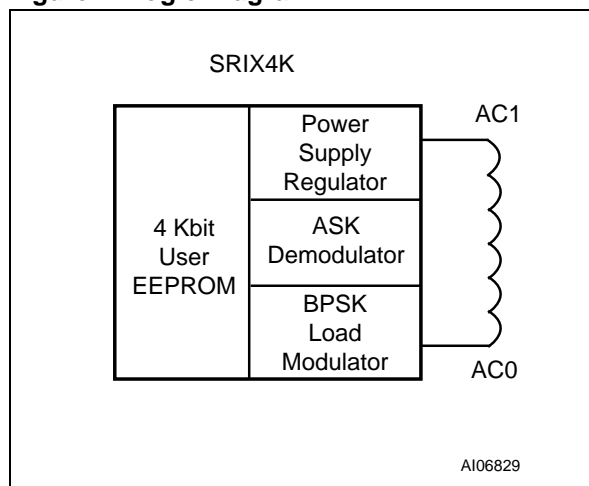


## SUMMARY DESCRIPTION

The SRIX4K is a contactless memory, powered by an externally transmitted radio wave. It contains a 4096-bit user EEPROM fabricated with STMicroelectronics CMOS technology. The memory is organised as 128 blocks of 32 bits. The SRIX4K is accessed via the 13.56MHz carrier. Incoming data are demodulated and decoded from the received Amplitude Shift Keying (ASK) modulation signal and outgoing data are generated by load variation using Bit Phase Shift Keying (BPSK) coding of a 847kHz sub-carrier. The received ASK wave is 10% modulated. The Data transfer rate between the SRIX4K and the reader is 106Kbit/s in both reception and emission modes.

The SRIX4K follows the ISO 14443 part 2 type B recommendation for the radio-frequency power and signal interface.

**Figure 2. Logic Diagram**



The SRIX4K targets short range applications which need secure and re-usable products. The SRIX4K includes an anti-collision mechanism that allows it to detect and select tags present at the same time within range of the reader. The anti-collision is based on a probabilistic scanning method using slot markers. The SRIX4K provides an anti-

clone function which allows its authentication. Using the STMicroelectronics single chip coupler, CRX14, it is easy to design a reader with the authentication capability and to build a system with a high level of security.

**Table 1. Signal Names**

AC1	Antenna Coil
AC0	Antenna Coil

The SRIX4K contactless EEPROM can be randomly read and write in block mode. Each block is composed by 32 bits. It offers a set of 10 commands:

- READ\_BLOCK
- WRITE\_BLOCK
- INITIATE
- PCALL16
- SLOT\_MARKER
- SELECT
- COMPLETION
- RESET\_TO\_INVENTORY
- AUTHENTICATE
- GET\_UID

The SRIX4K memory is organized in three areas, as described in Figure 3. The first area is a resettable OTP (one time programmable) area in which bits can only be switched from 1 to 0. Using a special command, it is possible to erase all bits of this area to 1. The second area provides two 32-bit binary counters which can only be decremented from FFFFFFFFh to 00000000h, and gives a capacity of 4,294,967,296 units per counter. The last area is the EEPROM memory. It is accessible by block of 32 bits and includes an auto-erase cycle during each WRITE\_BLOCK command.

## MEMORY MAPPING

The SRIX4K is organised as 128 blocks of 32 bits as shown in Figure 3. All blocks are accessible by the READ\_BLOCK command. Depending on the

write access, they can be updated by the WRITE\_BLOCK command. A WRITE\_BLOCK updates all the 32 bits of the block.

**Figure 3. SRIX4K Memory Mapping**

Block Addr	Msb b <sub>31</sub>	b <sub>24</sub> b <sub>23</sub>	32 bits Block b <sub>16</sub> b <sub>15</sub>	b <sub>8</sub> b <sub>7</sub>	Lsb b <sub>0</sub>	Description
0	32 bits Boolean Area					Resettable OTP bits
1	32 bits Boolean Area					
2	32 bits Boolean Area					
3	32 bits Boolean Area					
4	32 bits Boolean Area					
5	32 bits binary counter					Count down Counter
6	32 bits binary counter					
7	User Area					Lockable EEPROM
8	User Area					
9	User Area					
10	User Area					
11	User Area					
12	User Area					
13	User Area					
14	User Area					
15	User Area					
16	User Area					EEPROM
...	User Area					
127	User Area					

255	OTP_Lock_Reg	ST Reserved	Fixed Chip_ID (Option)	System OTP bits
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UID0	64 bits UID Area	ROM
UID1		

PART NUMBERING

For a list of available options (speed, package, etc.) or for further information on any aspect of this device, please contact your nearest ST Sales Office.

Table 2. Ordering Information Scheme

Example:	SRIX4K	–	W4	/	XXX
<b>Device Type</b>					
SRIX4K					
<b>Package</b>					
W4 =180 µm ± 15 µm Unsawn Wafer					
SBN18= 180µm ± 15 µm Bumped and Sawn Wafer on 8-inch Frame					
A3T= 38mm x 38mm Copper Antenna on Continuous Tape					
A3S= 38mm x 38mm Copper Singulated Adhesive Antenna on Tape					
A4T= 15mm x 15mm Copper Antenna on Continuous Tape					
A4S= 15mm x 15mm Copper Singulated Adhesive Antenna on Tape					
A5T= 42mm x 65mm Copper Antenna on Continuous Tape					
A5S= 42mm x 65mm Copper Singulated Adhesive Antenna on Tape					
<b>Customer Code</b>					
XXX = Given by STMicroelectronics					

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