



SR176

13.56MHz Short Range Contactless Memory Chip 176 bit USER EEPROM and 64 bits Unique ID

BRIEF DATA

- ISO 14443 - 2 Type B Air Interface Compliant
- ISO 14443 - 3 Type B Frame Format Compliant
- 13.56MHz Carrier Frequency
- 847kHz Sub-carrier Frequency
- 106K bit/s Data Transfer
- Data Transfert
 - ASK Modulation from Reader to tag
 - BPSK Coding from tag to Reader
- 64 bits Unique Identifier
- 176 bit EEPROM with Write Protect Feature
- READ BLOCK & WRITE BLOCK (16 Bits)
- Internal Tuning Capacitor
- 100K ERASE/WRITE Cycles
- 10 Years Data Retention
- Self-Timed Programming Cycle
- 5ms Typical Programming Time

DESCRIPTION

The SR176 is a contactless memory powered by the received carrier electromagnetic wave. It is a 176 bits user EEPROM fabricated with STMicroelectronics CMOS technology. The memory is organised as 16 blocks of 16 bits on which 11 blocks are user accessible. The SR176 is accessed via the 13.56MHz carrier. Incoming data are demodulated and decoded from the received Amplitude Shift Keying modulation signal (ASK) and outgoing data are generated by load variation using Bit Phase Shift Keying coding (BPSK) of a 847kHz sub-carrier. The received ASK wave is 10% modulated. The Data transfer rate between the SR176 and the reader is 106Kbit/s in both reception and emission modes.

The SR176 follows the ISO 14443 part 2 type B recommendation for Radio frequency power and signal interface.

Figure 1. Delivery Forms

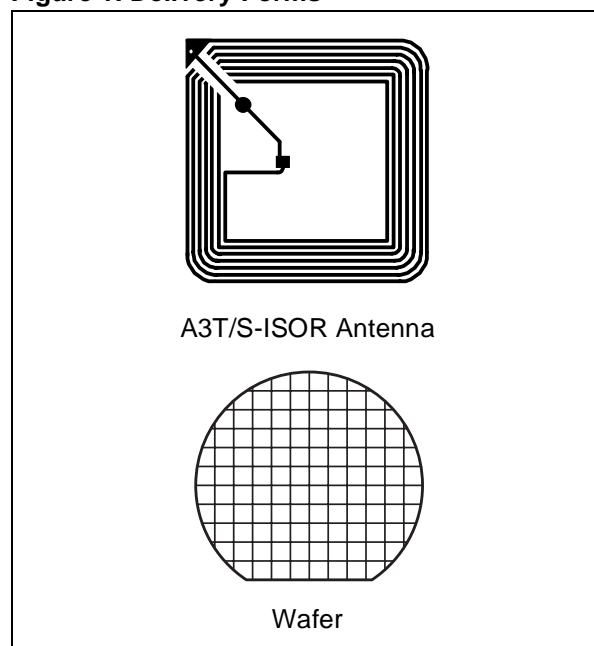


Figure 2. Pad Connections

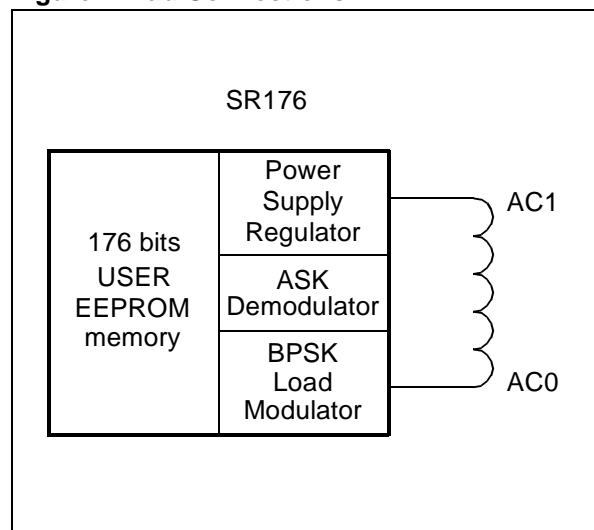


Table 1. Signal Names

AC1	Antenna Coil
AC0	Antenna Coil

DESCRIPTION (cont'd)

The SR176 is principally designed for short range applications, such as in object identification, that need a low cost and non-reusable product. The SR176 does not include any anti-collision mechanism. It provides an “addressed” selection mechanism to cope with cases where more than one tag is present within the range of the reader.

The SR176 contactless EEPROM memory offers read and write random access in block mode. One block is composed by 16 bits. The device has an instruction set containing 7 commands:

- READ_BLOCK
- WRITE_BLOCK
- INITIATE
- SELECT
- COMPLETION
- PROTECT_BLOCK
- GET_PROTECTION.

The SR176 is divided into two major areas: the unique identifier (UID) and the User EEPROM. The UID is a 64 bits unique identifier written by ST during product manufacturing. The User EEPROM is divided into areas which can be write protected in

order to behaves as ROM. The write protection is activated using an OTP lock bits register.

It is possible to program the SR176 four bits chip_ID used by the SELECT command. Its default value is fixed at the value 15 (1111_b) by ST. When correctly set, up to 15 SR176 can be selected individually.

MEMORY MAPPING

The SR176 is organised as 16 blocks of 16bits as shown in Figure 3.

The first 4 blocks, from location 0 to 3, are used to store read only data. They store the 64 bits UID. This value cannot be modified.

Blocks from location 4 to 14 offer a 176 bits EEPROM user area on which the application will store its data values. Blocks 15 contain the OTP lock bits and the programmed Chip_ID.

The PROTECT_BLOCK command is used to lock write access to blocks 4 to 15 by group of 2 blocks.

The GET_PROTECTION command gives the status of the protection of blocks 4 to 15.

Figure 3. SR176 Memory Mapping

Block Address	Msb b ₁₅	16bits Block b ₈ b ₇	Lsb b ₀	Description
0		64 bits UID		ROM
1				
2				
3				
4	User Area			EEPROM Lockable
5	User Area			
6	User Area			EEPROM Lockable
7	User Area			
8	User Area			EEPROM Lockable
9	User Area			
10	User Area			EEPROM Lockable
11	User Area			
12	User Area			EEPROM Lockable
13	User Area			
14	User Area			EEPROM Lockable
15	OTP lock bits	Reserved	Chip_ID	

ORDERING INFORMATION SCHEME

Example

SR176 - W4 / 070

Delivery Form

W4/070	180µm ± 15µm unsawn wafer, 70pF tuning capacitor
A3T/S-ISOR	Half ISO Copper Antenna on Tape

For a full list of the available options, please see the current Memory Shortform Catalogue.

For further information on any aspect of this device, please contact your nearest ST Sales Office.

E-mail contact: memories.contactless@st.com

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