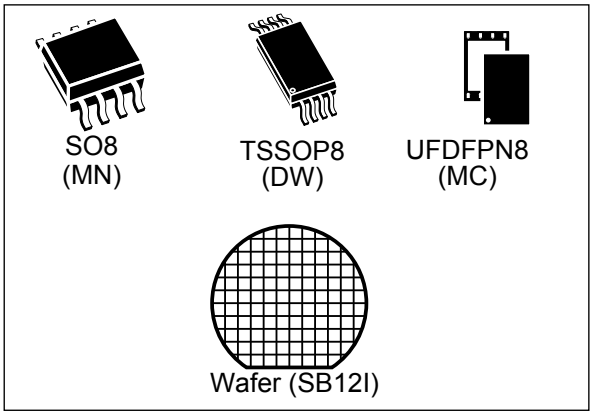
M24SR64-Y

Dynamic NFC/RFID tag IC with 64-Kbit EEPROM, NFC Forum Type 4 Tag and I²C interface

Data brief



Features

I²C interface

- Two-wire I²C serial interface supports 1 MHz protocol
- Single supply voltage: 2.7 V to 5.5 V

Contactless interface

- NFC Forum Type 4 Tag
- ISO/IEC 14443 Type A
- 106 Kbps data rate
- Internal tuning capacitance: 25 pF

Memory

- 8-Kbyte (64-kbit) EEPROM
- Support of NDEF data structure
- Data retention: 200 years
- Endurance: 1 million erase-write cycles
- Read up to 246 bytes in a single command
- Write up to 246 bytes in a single command
- 7 bytes unique identifier (UID)
- 128 bits passwords protection

Package

- 8-lead small-outline package (SO8) ECOPACK®2
- TSSOP8 ECOPACK®2
- UFDFPN8 ECOPACK®2

Digital pad

- GPO: configurable General Purpose Output
- RF disable: activation/deactivation of RF commands

Description

The M24SR64-Y device is a dynamic NFC/RFID tag IC with a dual interface. It embeds an EEPROM memory. It can be operated from an I²C interface or by a 13.56 MHz RFID reader or an NFC phone.

The I²C interface uses a two-wire serial interface, consisting of a bidirectional data line and a clock line. It behaves as a slave in the I²C protocol.

The RF protocol is compatible with ISO/IEC 14443 Type A and NFC Forum Type 4 Tag.

Contents

List of tables

List of figures

1 Functional description

The M24SR64-Y device is a dynamic NFC/RFID tag that can be accessed either from the I^2C or the RF interface. The RF and I^2C host can read or write to the same memory, that is why only one host can communicate at a time with the M24SR64-Y. The management of the interface selection is controlled by the M24SR64-Y device itself.

The RF interface is based on the ISO/IEC 14443 Type A standard. The M24SR64-Y is compatible with the NFC Forum Type 4 Tag specifications and supports all corresponding commands.

The I^2C interface uses a two-wire serial interface consisting of a bidirectional data line and a clock line. The devices carry a built-in 4-bit device type identifier code in accordance with the I²C bus definition.

The device behaves as a slave in the I^2C protocol.

Figure 1 displays the block diagram of the M24SR64-Y device.

Figure 1. M24SR64-Y block diagram

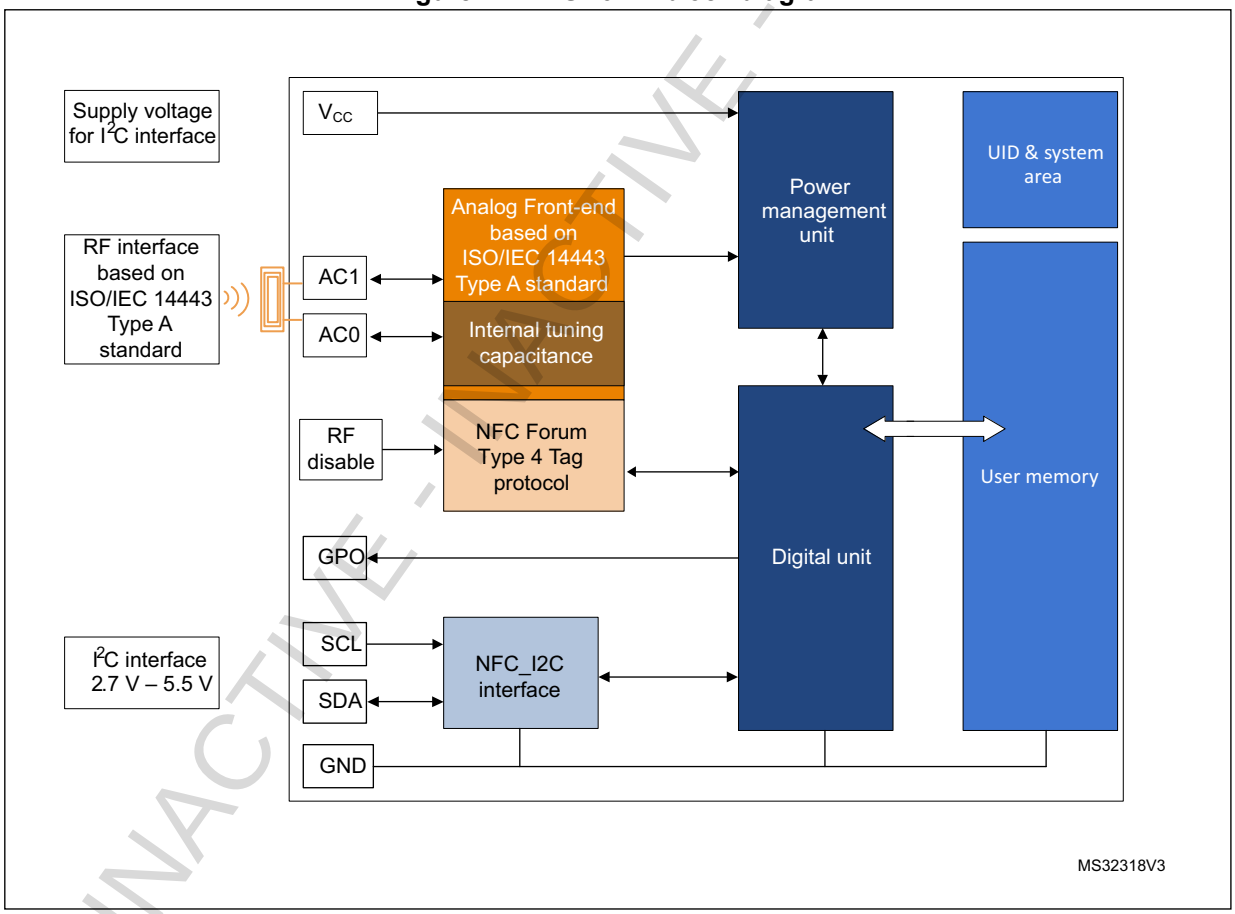
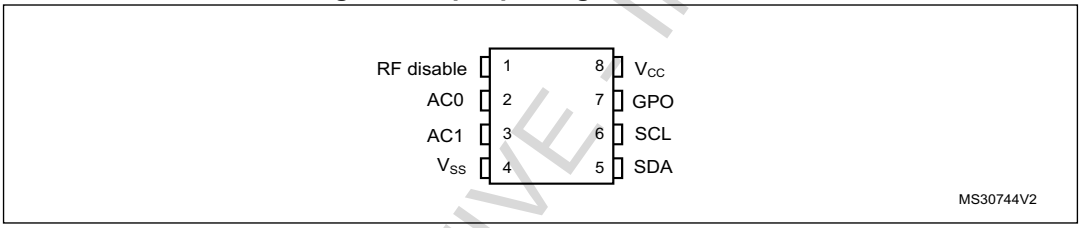


Table 1. Signal names

Signal name	Function	Direction
SDA	Serial data	I/O
SCL	Serial clock	Input
AC0, AC1	Antenna coils	-
V_{CC}	Supply voltage	-
VSS	Ground	-
GPO	Interrupt output (1)	Open drain output
RF disable	Disable the RF communication (2)	Input

1. An external pull-up > 4.7 kΩ is required.
2. An external pull-down is required when the voltage on V_{cc} is above its POR level.

Figure 2. 8-pin package connections



1. See Package mechanical data section for package dimensions, and how to identify pin 1.

1.1 Functional modes

The M24SR64-Y has two functional modes available. The difference between the modes lies in the power supply source (see *Table 2*).

Table 2. Functional modes

Modes	Supply source	Comments
I^2C mode	V_{cc}	The I^2C interface is available
Tag mode	RF field only	The I^2C interface is disconnected
Dual interface mode	RF field or V_{cc}	Both I^2C and RF interfaces are available

1.1.1 I^2C mode

M24SR64-Y is powered by V_{CC}. The I^2C interface is connected to the M24SR64-Y. The I^2C host can communicate with the M24SR64-Y device.

1.1.2 Tag mode

The M24SR64-Y is supplied by the RF field and can communicate with an RF host (RFID reader or an NFC phone). The User memory can only be accessed by the RF commands.

1.1.3 Dual interface mode

Both interfaces, RF and I^2C, are connected to the M24SR64-Y and both RF or I^2C host can communicate with the M24SR64-Y device. The power supply and the access management are carried out by the M24SR64-Y itself. For further details, please refer to the token mechanism chapter.

2 Part numbering

Table 3. Ordering information scheme for packaged devices

Example: M24 SR 64- Y MN 6 T /2

Device type

M24 = I^2C interface device

Device feature

SR = Short range

Memory size

64 = memory size in Kbits

Voltage range

Y = 2.7 to 5.5 V

Package

MN = SO8N
DW = TSSOP8
MC = UFDFPN8
SB12I = 120 µm ± 15 µm bumped and sawn inkless wafer on 8-inch frame

Device grade

6 = industrial: device tested with standard test flow over –40 to 85 °C
(No parameter for SB12I)

Option

T = Tape and reel packing
(No parameter for SB12I)

Capacitance

/2 = 25 pF

3 Revision history

Table 4. Document revision history

Date	Revision	Changes
14-May-2012	1	Initial release.
14-Jan-2013	2	Reshaped from M24SR64-Y Datasheet, with file sharing; changed different information.
17-Sep-2013	3	Updated from M24SR64-Y Datasheet, version 6, including the title change to *Dynamic NFC/RFID Tag IC with 4-Kbit EEPROM, NFC Forum Type 4 Tag and I²C interface*. Changed the capacitance from 27.5 pF to 23.5 pF in the *Features*, in *Figure 1: M24SR64-Y block diagram* and *Table 3: Ordering information scheme for packaged devices*. Added footnote (2) to *Table 1: Signal names*.
05-Feb-2014	4	Updated from M24SR64-Y Datasheet, version 8. Removed Section 2 : Signal descriptions. Removed Section 3 : M24SR64-Y memory management. Removed Section 4 : Package mechanical data.

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