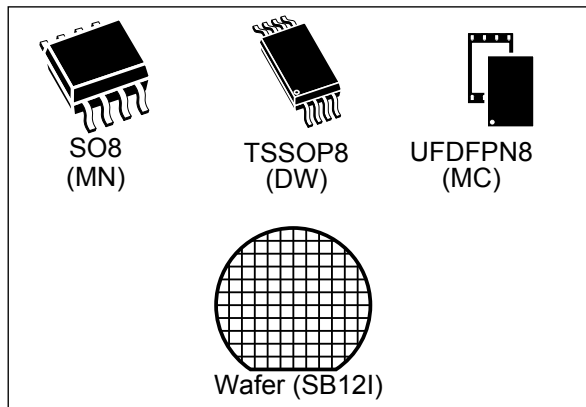

**Dynamic NFC/RFID tag IC with 64-Kbit EEPROM,
NFC Forum Type 4 Tag and I²C interface**

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

- 1 Functional description 5**
 - 1.1 Functional modes 6
 - 1.1.1 I2C mode 6
 - 1.1.2 Tag mode 6
 - 1.1.3 Dual interface mode 7

- 2 Part numbering 8**

- 3 Revision history 9**

List of tables

Table 1.	Signal names	6
Table 2.	Functional modes	6
Table 3.	Ordering information scheme for packaged devices.	8
Table 4.	Document revision history.	9

List of figures

Figure 1. M24SR64-Y block diagram 5
Figure 2. 8-pin package connections 6

1 Functional description

The M24SR64-Y device is a dynamic NFC/RFID tag that can be accessed either from the I²C or the RF interface. The RF and I²C 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 I²C 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 I²C protocol.

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

Figure 1. M24SR64-Y block diagram

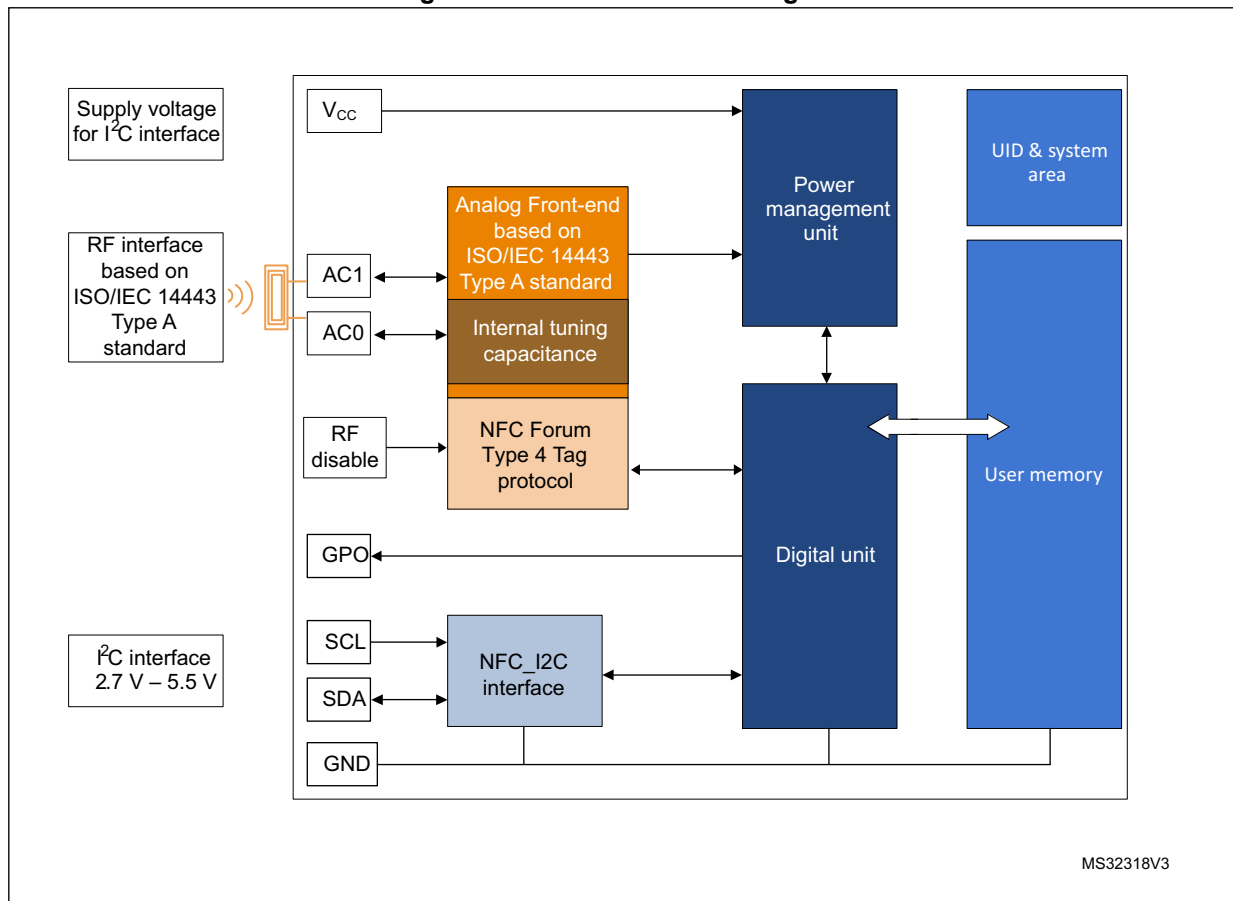
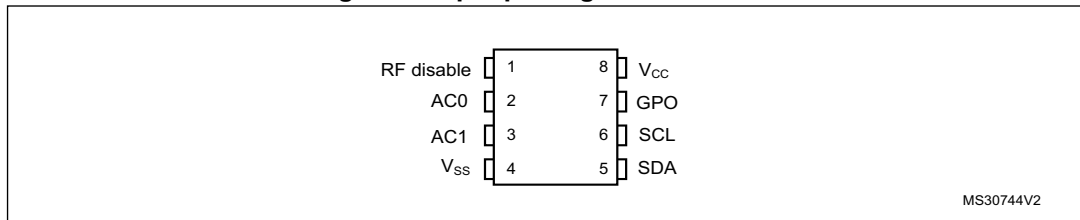


Table 1. Signal names

Signal name	Function	Direction
SDA	Serial data	I/O
SCL	Serial clock	Input
AC0, AC1	Antenna coils	-
V _{CC}	Supply voltage	-
V _{SS}	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 ² C mode	V _{CC}	The I ² C interface is available
Tag mode	RF field only	The I ² C interface is disconnected
Dual interface mode	RF field or V _{CC}	Both I ² C and RF interfaces are available

1.1.1 I²C mode

M24SR64-Y is powered by V_{CC}. The I²C interface is connected to the M24SR64-Y. The I²C 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 I²C, are connected to the M24SR64-Y and both RF or I²C 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 ² C 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 <i>Dynamic NFC/RFID Tag IC with 4-Kbit EEPROM, NFC Forum Type 4 Tag and I²C interface</i> . Changed the capacitance from 27.5 pF to 23.5 pF in the <i>Features</i> , in <i>Figure 1: M24SR64-Y block diagram</i> and <i>Table 3: Ordering information scheme for packaged devices</i> . Added footnote (2) to <i>Table 1: Signal names</i> .
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.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2014 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com